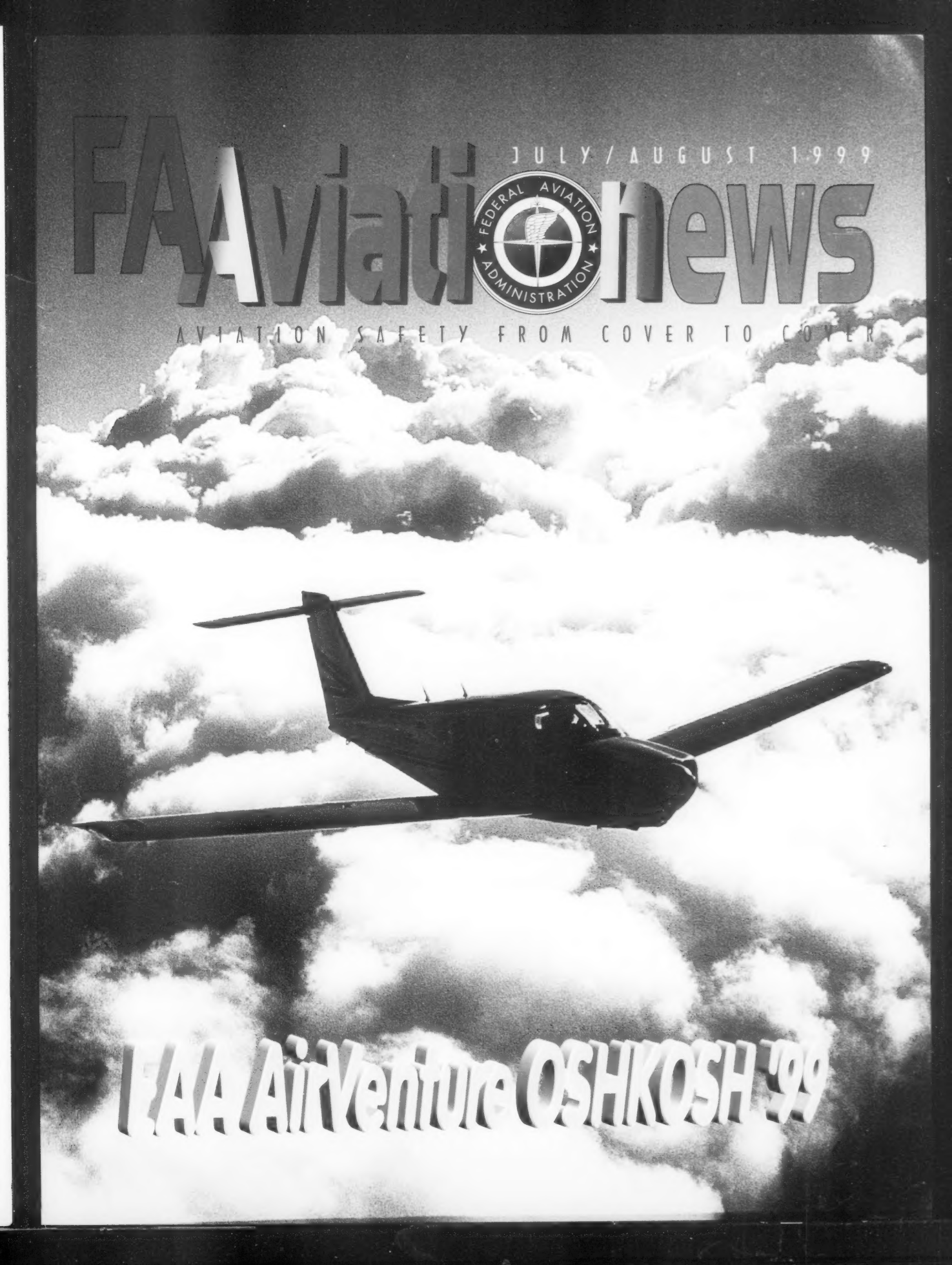
JULY/AUGUST 1999

FAA Aviation news

AVIATION SAFETY FROM COVER TO COVER



EAA AirVenture OSHKOSH '99

U.S. Department
of Transportation

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FAA Aviation news

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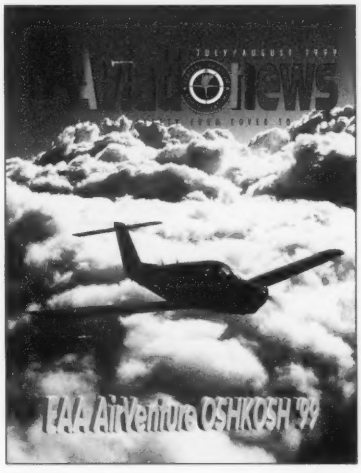


FRONT COVER: A Piper Arrow IV *winging its way to EAA AirVenture '99. Piper Aircraft Photo*
BACK COVER: Beech Duke *equipped with dual aft strakes, winglets, and vortex generators used in boundary layer research. Photo by Tim Heneghan.*

A. Mario Toscano photo

EAA AirVenture OSHKOSH '99

The special FAA Air Traffic Management Plan Notice to Airmen (NOTAM) for the 47th annual Experimental Aircraft Association's (EAA) Fly-In Convention at Wittman Regional Airport, Oshkosh, WI, is available. The NOTAM provides detailed arrival and departure procedures for aircraft flying to, through, and from the Oshkosh area from July 25 to August 3. Note the special NOTAM procedures start three days before EAA AirVenture Oshkosh '99 officially opens this year's dates are July 28 to August 3. As noted in the NOTAM, "Pilots should expect last minute changes to previously issued or anticipated procedures and/or clearances."

Like our past *FAA Aviation News* articles on the fly-in, this article does not provide detailed operating procedures for flying to AirVenture Oshkosh '99. Rather, it provides a brief overview of some of the important safety information and flight services provided in the NOTAM, the video, and the special reference booklet prepared for the event. Pilots planning on flying to AirVenture Oshkosh '99 should obtain copies of the below referenced products designed to help them plan for a safe flight to and from Wittman Regional Airport at Oshkosh by noting the procedures, both old and new, outlined in the NOTAM. Like all flights, no flight is complete until the pilot and passengers are all home safely. Getting to Wisconsin is only half of the trip. Getting safely home after a great visit to AirVenture Oshkosh '99 is the pilot in command's ultimate responsibility.

NEW TIPS

All pilots should review their respective holding procedures in case holding is required.

Warbird pilots should review their special operating procedures for changes from last year's published procedures. Page 15 of the NOTAM details the new warbird operating procedures and changes for 1999. Important notice: There has been a change

made in the "New In 1999" section on page 15. A tower frequency has been added in the first paragraph. Part of that first paragraph now states that Warbird pilots who cannot maintain a maximum forward speed of 150 knots are to proceed from over FLD for a straight in approach to Runway 36L. They are to report abeam the "Warbird Island" to OSH tower on frequency 118.9 MHz stating type of aircraft and position. To read all of the new information, Warbird pilots should review page 15 of the NOTAM for complete details.

FAA OSHKOSH NOTAM, VIDEO, AND FLY-IN QUICK REFERENCE BOOKLET

In addition to the FAA's special EAA AirVenture Oshkosh 1999 NOTAM, the FAA Office of System Safety has produced a video and Fly-In Quick Reference Booklet highlighting the procedures outlined in the NOTAM. For a copy of the NOTAM, video, and Fly-In Quick Reference Booklet, pilots can call (800) 564-6322.

EAA AirVenture Oshkosh '99 information will also be published in the Special Airshow Section of the (July 17) FAA Notices to Airmen publication.

Even if you have flown to Oshkosh in the past, you will still need to review the NOTAM for changes.

If this is your first flight to Oshkosh, you need to get a copy of the NOTAM and study it in detail. You should also try to review a copy of the video. If you are a first time flight arrival, finding yourself number 10 in trail to enter the traffic pattern is not the time to wonder what is going to happen next.

Although the arrival and departure procedures are not complicated, they do need to be understood very well. The procedures are designed to move hundreds of aircraft safely, quickly, and predictably in and out of the Oshkosh area and Wittman Regional Airport by having both pilots and controllers follow the same published procedures. Knowing and following the published procedures are especially important in the case of an emergency at Wittman Regional Airport or one of the nearby airports.

Another important operational procedure is the limited use of radio communications to control aircraft landing or departing at Oshkosh. The NOTAM outlines when pilots should communicate and when they should just monitor their radios. Strict compliance with the published communication procedures will avoid any unnecessary frequency congestion while speeding up the landing or departure process. But every pilot should contact ATC immediately if there is any question of safety of flight or in case of an emergency. Pilots should also remember some of the aircraft flying to and from the Oshkosh area don't have radios.

The NOTAM has special sections for both IFR and VFR pilots.

VFR pilots should pay particular attention to the airspace information given because of the number of aircraft involved.

WAYS TO MINIMIZE RISK OF MIDAIR COLLISION

All pilots need to pay attention to other traffic as they approach the Oshkosh area. Since there is such a performance mix among the different types of aircraft flying to, through, or in the Oshkosh area, there is an increased mid-air collision risk. One way to reduce that risk is to fly with your landing lights and beacon or strobe lights on within 30 miles or so of Oshkosh. If you are flying on an airway, you might want to extend that lights-on distance. Pilots need to be alert for traffic from any direction as they approach Oshkosh. You should also monitor the appropriate ATC frequencies listed in the NOTAM when flying within the area. Everyone should also use the appropriate altitude for your respective direction and type of flight, IFR or VFR.

VFR CROSSING OF LAKE MICHIGAN

The NOTAM outlines in detail two important safety services for pilots planning to fly across Lake Michigan. One is a chart showing the minimum reception altitudes and coverage areas for communications around and over the lake for the altitudes of 1,500, 2,500, 3,500, and 4,500 FT MSL. Note: Not all these altitudes provide continuous radio coverage around the lake. Radio coverage of the emergency frequency 121.5 MHz is available over most of the lake only at a minimum altitude of approximately 4,600 Ft. MSL. Higher is always better.

Appropriate flotation gear should be carried onboard aircraft that plan on crossing the lake at an altitude below the aircraft's minimum engine-out gliding distance to the nearest shore. Pilots should compute that distance based upon the prevailing winds aloft.

The second safety service is the Lake Reporting Service (LRS) provided by the Green Bay and Lansing Automated Flight Service Stations (AFSS's) for aircraft crossing Lake Michigan. Although the Lake Reporting Service is outlined in the *Aeronautical Information Manual* (AIM), briefly, a LRS flight plan is a separate flight plan filed when over flying the lake. It is like a typical flight plan, but it also requires the route and time over water. Pilots must list the departure and arrival shore crossing points. The diagram in the NOTAM shows a map of the lake with VOR frequencies, radio frequencies, minimum reception altitudes, land reporting points, and the responsible AFSS's for various locations around Lake Michigan. A chart is also provided which includes distances between crossing points.

Once a LRS flight plan is activated, radio contact must be made every 10 minutes. If no contact is made within 15 minutes, search and rescue will be alerted. Pilots are responsible for activating and canceling their respective Lake Reporting Service flight plans. Pilots who have a communication failure must land and notify a flight service station as soon as possible.

Please note: A Lake Reporting Service flight plan is separate and in addition to your normal flight plan. When activating and canceling your Lake Reporting Service flight plan, please be specific as to what flight plan you are activating and closing. When departing Oshkosh, please file your Lake Reporting Service flight plan in person or by telephone at the Oshkosh FSS be-

fore departure to avoid the radio congestion caused by air filing.

ELT MONITORING EN ROUTE

Pilots flying to and from the Oshkosh area should periodically monitor 121.5 MHz en route to check for any activated emergency locator transmitters (ELT) that might be reporting an aircraft accident. If you detect an ELT signal, contact the appropriate air traffic control (ATC) facility responsible for the area you are in with the following information. You should be able to report your time, location, and altitude of when you first received the alert and when you last heard the alert when you contact ATC.

FUEL EXHAUSTION

Another potential problem for some aircraft is fuel exhaustion. Because of the potential delay with so many aircraft operating within the Oshkosh area, including the risk of an accident on the field closing the airport for a while, all pilots should make sure they have enough extra fuel on board for the flight plus any required IFR or VFR minimums plus enough fuel for an inflight hold of at least 30 minutes or more. This is a case where the more fuel, the better. Just stay within your approved weight and balance limitations.

In addition to allowing yourself extra fuel, VFR flights should extend their projected flight plans by 30 minutes to compensate for any unexpected delays because of traffic.

All pilots should review the flight plan filing and closing procedures in the NOTAM.

MAINTAINING SAFE FLYING SPEEDS

Because of the mix of traffic, all pilots might want to practice flying their aircraft at its minimum safe—the operative word is minimum SAFE airspeed—before arriving at Oshkosh. Whether you do it at home on a practice flight or en route to Oshkosh, you should be able to control your aircraft safely at its slowest recommended airspeed, its normally recommended airspeed, and at a faster than normal airspeed. The same is true for landing approach speeds. The reason is you may be mixed in with other aircraft that may be slower or faster than you. You may also need to be able to maintain your place in trail of other aircraft. But as the NOTAM states, if you cannot safely reduce airspeed to follow slower traffic, inform ATC and do not, we repeat do not, fly at any airspeed that jeopardizes your safety of flight.

ARRIVAL PROCEDURES

The NOTAM explains in detail with charts and text the modified VFR arrival procedures in effect during EAA AirVenture Oshkosh '99. All pilots need to review these procedures before arriving in the Oshkosh general area because even IFR flights may be directed to follow the VFR procedures when the weather is VFR at the airport.

Because of the various planned flight activities at Wittman Regional Airport during the EAA Fly-In Convention and the special operating restrictions including when the airport is closed because of the daily airshow, all pilots need to review the NOTAM for such items as airport operating hours, arrival altitudes, airspeeds, airport surface operating procedures, airport safety notes, parking notes, and other operating procedures listed in the NOTAM.

FINAL ELT CHECK

After landing and before securing your aircraft, all pilots in radio equipped aircraft are asked to do a final radio check on 121.5 MHz to check for an inadvertent emergency locator transmitter (ELT) activation. With the large number of aircraft attending EAA AirVenture Oshkosh '99, you can imagine the difficulty in finding the source of an inadvertent ELT signal or multiple ELT signals.

FAA SAFETY CENTER–AND–WEATHER TO GO

While at EAA AirVenture Oshkosh '99, visit the FAA's Safety Center for all your aviation needs. The FAA Safety Center has Flight Service Station specialists available for your weather and flight planning needs, Flight Standards aviation safety inspectors from the Milwaukee FSDO to provide support, various FAA displays and exhibits as well as an ongoing schedule of FAA and industry safety presentations. Many of the presentations are given by nationally known speakers. The Safety Center is located near the FAA control tower on the Wittman Regional Airport.

SPECIAL AIRCRAFT PROCEDURES

As in past years, there are special procedures for various types of aircraft and type of flight plans. Warbirds, aircraft without radios, ultralight vehicles, seaplanes, IFR procedures and reservations, VFR aircraft and procedures, the establishment of a temporary air traffic control tower at Fond Du Lac (FLD) airport, and the use of reduced arrival and departure separation standards in the Oshkosh area are all covered in the NOTAM. The NOTAM also shows the special flight procedures for flying around Chicago and Milwaukee airspace.

Now if the weather folks could only put out a NOTAM guaranteeing perfect weather for EAA AirVenture Oshkosh '99. But regardless of the weather, if you are flying to Oshkosh, please plan carefully, file and activate your flight plan, take your time, remember to close your VFR flight plan upon arrival if you are going VFR, and last but not least, "Have a great time."

ADDITIONAL INFORMATION

For more information, you can contact EAA by writing to the EAA Aviation Center, PO Box 3086, Oshkosh, WI 54903-3086, or by calling (920) 426-4800. EAA's main Internet website is http://www.eaa.org. For EAA AirVenture Oshkosh '99 specific information, you should check http://www.airventure.org.

FAA AVIATION SAFETY CENTER

EAA AirVenture OSHKOSH '99

FORUM SCHEDULE

(Subject to change without notice)

WEDNESDAY, JULY 28

8:30 - 9:45	"Flying's Second Greatest Thrill...Why Are Landings So Hard?"
10:00 - 11:15	"Human Performance in Recent Accidents"
11:30 - 12:45	"Owner/Operator Maintenance Responsibilities According to FARs"
1:00 - 2:15	"Solving the Mysteries of Special Use Airspace"
2:30 - 3:45	"Signs, Signs, Everywhere a Sign!"
4:00 - 5:15	"Amateur Built Kit Evaluation/Airworthiness Certification"
5:30 - 6:45	"Mountain Flying Techniques"
7:00 - 8:15	"A Physical Description of Flight"

THURSDAY, JULY 29

8:30 - 9:45	"Human Factors and Spatial Disorientation"
10:00 - 11:15	"You're on the Air! - Radio Communications Bloopers"
11:30 - 12:45	"GPS for VFR Pilots"
1:00 - 2:15	"FLYING FUN - While Avoiding Unwanted Adventure"
2:30 - 3:45	"A Physical Description of Flight"
4:00 - 5:15	"Avionics Installations"
5:30 - 8:15	"High Altitude Physiology Training" (Includes all ground training on high altitude physiology subjects required by 14 CFR 61.31 (g)(1) for pressurized aircraft. A training record endorsement certifying course completion will be provided to each participant.)

FRIDAY, JULY 30

8:30 - 9:45	"Common Errors - Uncommon Results"
10:00 - 11:15	"What the Pilot Masters Know"
11:30 - 12:45	"Weather Strategies "
1:00 - 2:15	"Personal Minimums - Making Your Own Rules"
2:30 - 3:45	"GPS Update"
4:00 - 5:15	"Owner/Operator Maintenance Responsibilities According to FARs"
5:30 - 6:45	"Solving the Mysteries of Special Use Airspace"
7:00 - 8:15	"Why Did I Do That? - Common Pilot Mistakes"

SATURDAY, JULY 31

8:30 - 9:45	"Process for Making the Right Pilot Decisions"
10:00 - 11:15	"Weather Tactics"
11:30 - 12:45	"GPS Update"

1:00 - 2:15	"FLYING FUN - While Avoiding Unwanted Adventure"
1:00 - 2:15	"After the Dust Settles - NTSB Reports the Facts"
2:30 - 3:45	"Certification of Experimental Aircraft"
4:00 - 5:15	"Automated Weather - How'd They Do That?"
5:30 - 6:45	"Terrain Awareness and Warning System: New Operator Requirements "
7:00 - 8:15	" Medical Special Issuance Certification"

SUNDAY, AUGUST 1

8:30 - 9:45	"Reducing Runway Incursions -- What You Can Do"
10:00 - 11:15	"Flying Left Seat - Passing Your Next Medical"
11:30 - 1:15	"Meet the Administrator"
1:30 - 2:15	"Aeronautical Data Link Update"
2:30 - 3:45	"Aviation Weather for Pilots"
4:00 - 5:15	"Operations at Towered Airports"
5:30 - 6:45	"Aircraft Airworthiness BEFORE Flight"
7:00 - 8:15	"Airborne Communications and Navigation Requirements"

MONDAY, AUGUST 2

8:30 - 9:45	"Continued Airworthiness for Field Approvals"
10:00 - 11:15	"Weather Related GA Accidents"
11:30 - 12:45	"Why Engines REALLY Quit: The Top 10 Reasons"
1:00 - 2:15	"Mountain Flying Techniques"
2:30 - 3:45	"Ultralights/Experimental Airworthiness Certification"
4:00 - 5:15	"VFR Airspace Operations and Equipment Requirements"
5:30 - 6:45	"Automated Weather - How'd They Do That?"
7:00 - 8:15	"Global Navigation Satellite Systems (GNSS) Update"

TUESDAY, AUGUST 3

8:30 - 9:45	"Maintenance Records"
10:00 - 11:15	"Common Errors - Uncommon Results"
11:30 - 12:45	"Flying's Second Greatest Thrill...Why Are Landings So Hard?"
1:00 - 2:45	"Review of FAR Part 61 - Changes and Updates"

FAA forums are held in the FAA Aviation Safety Center, located just north of and next to EAA Wearhouse.

Pilots Learning GPS Find It's Not So Easy As ABC

by Mike Lenz

The pilot was very impressed with the handheld GPS gift from his spouse. "I have saved a lot of fuel and time on every leg where ATC was able to assign a direct routing. Until I used this GPS, several miles either side of centerline was on course. Now, if I'm more than 100 feet from centerline, I make a correction. After being cleared direct, I haven't had a single ATC call for course correction."

This quote probably conjures up thoughts of a general aviation pilot in a Cessna or Mooney happily navigating using GPS technology. In fact, the author is an MD-80 captain! The pilot's company suggested that he not use the handheld GPS in flight since there was a prohibition against passenger use of such devices because of possible interference. The point is the sophistication and accuracy that pilots

can now hold in the palm of their hand now rivals the navigation and flight management systems in some of the world's most sophisticated airliners.

This accuracy and sophistication comes at a cost, however, as was pointed out by a controller who saw three incidents in two weeks when pilots landed at the wrong airport. "With the advent of GPS few pilots look out the window anymore. Pilotage is a lost art. We usually see the boneheads coming and scramble to move everyone out of their way!" The aircraft involved included two business jets and a top-of-the-line single engine aircraft. Pilots of these types of planes are rarely characterized as "boneheads," but in these cases something apparently caused them to make potentially serious mistakes.

If we look at some of the operational differences between GPS and conventional VOR navigation, two key differences come to light. One is that pilots are now programming an automated system instead of simply tuning a frequency and following a course radial. The other is that the GPS signal is almost always available and will happily take you wherever it is programmed or "misprogrammed!" The phenomenal accuracy pilots are used to seeing with GPS leads them to think, "This thing must be right."

One pilot in a Cessna 152 launched from Allegheny County Airport near Pittsburgh on a training flight to learn to use the GPS. When it was time to return, the pilot selected the destination airport input from the GPS menu option of "nearest airport" and accidentally selected the Greater Pittsburgh Airport (PIT) from the list of airports. The pilot said the contributing factors were a mental fixation on tracking the GPS course line, plus the involvement with programming it and looking for traffic. "It was such a clear day that I thought the airport I saw at eight miles away was Allegheny County. I had the mental fixation that it was the right one." But at three miles from PIT, the pilot realized the error.

The amazing accuracy of GPS may lead VFR pilots erroneously into a position formerly reserved for instrument-rated pilots who can execute an instrument approach and land in minimum visibility out of a low overcast. There have been reports by VFR pilots who were right over their destination airport at night trying to land using GPS when the airport lighting had unexpectedly failed. They knew they were right over the airport and could faintly make out some features, but fortunately they diverted to another field instead of trying to descend "just a little lower" to get a better look. GPS is accurate, but it generally doesn't display obstacles.

The reliability of the GPS satellite signal is also being taken for granted. Like anything mechanical or electrical, a GPS satellite can fail. Pilots need to have a backup plan. This was best summarized by another airline pilot who used his newly purchased handheld GPS to navigate around some weather when returning home in his Cessna 180. He was so impressed with how accurate and reliable GPS is that he commented that it might lead people into situations where they should not be. He feels all flight instructors should indicate this factor in big red letters to all of their students by telling them to "Don't rely solely on the magic!"

Recognizing some of these GPS operational pitfalls will help pilots see the importance of becoming thoroughly familiar with their GPS before using it in flight. Then it's a good idea to have a flight instructor with you, or at least a safety pilot, for the first few flights. Learning from some of the above tight spots pilots have gotten into using GPS will help others utilize the fantastic benefits that GPS offers pilots while avoiding some of the GPS pitfalls.

Mike Lenz is a Program Analyst with FAA's Office of System Safety, ASY-300, and is a pilot in FAA's Flight Program.

A-R-O-W ????

by H.Dean Chamberlain

Recently one of the technical representatives at the Aircraft Owners and Pilots Association (AOPA) sent an email message to this writer asking what was the regulatory basis for the aircraft acronym "AROW." For those not familiar with the term, pilots use the term as a memory aid for remembering the documents required in most general aviation aircraft before a flight. The person had been asked by an AOPA member for the information, and although a flight instructor, the AOPA representative said he couldn't remember where to find the appropriate FAR requirement for all of the letters of the acronym. He had them all except for the "W" or the letter representing weight and balance.

A-R-O-W

For those not familiar with the acronym: "A" refers to the airworthiness certificate required to be displayed in the aircraft; "R" refers to the aircraft registration certificate required to be in the aircraft; "O" refers to the operating limitations (aircraft flight manual, pilot operating manual, placards, etc. as appropriate); and the "W" refers to weight and balance data. Some of you may remember that AROW once had two "R's" in it. The second "R" referred to radio and the required Federal Communication Commission's (FCC) radio station license. The FCC no longer requires an aircraft radio station license for radio communications transmitters in U.S. registered aircraft in domestic operations. Remember, travel to Canada and Mexico are international flights.

A-R-O-W AND THE FAR

How many of you know what is the regulatory basis for the various documents required to be onboard a general aviation aircraft operated under FAR Part 91?

If you are not sure, let's review the requirements. Some are obvious. Some are not so obvious. But we must point out we are only talking about those aircraft being operated under FAR Part 91 that are small, single-engine piston powered aircraft and are not being operated for hire or commercial purposes. The reason for the limited type of aircraft and operation is because certain types of aircraft and operations such as commuter or air carrier ops have their own specific rules that apply to the aircraft or flight operation. In many cases, the other aircraft and operating rules are more explicit than FAR Part 91.

Let's do the easy ones first. FAR §91.203, Civil aircraft: Certifications required, states in part that "(a) Except as provided in §91.715, no person may operate a civil aircraft unless it has within it the following: (1) An appropriate and current airworthiness certificate...." The rule then goes into detail of what meets this requirement for different types of operations and circumstances. Section (2) of the rule then states, "An effective U.S. registration certificate issued to its owner or, for operation within the United States, the second duplicate copy (pink) of the Aircraft Registration Application as provided for in §47.31(b), or a registration certificate issued under the laws of a foreign country." Then paragraph (b) of the rule states, "No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

The above rule makes the requirement for the airworthiness and registration documents in civil aircraft pretty cut and dried. Nothing too complicated in this rule. The rule even states where the airworthiness certificate has to be displayed. As noted, the rule only applies to civil aircraft. It does not apply to military or public aircraft.

As we said earlier, the "A" and the "R" are easy to identify. The harder ones are to come.

THE CASE OF THE MISSING "O"

The "O" is not as clearly defined as the "A" and "R" were. The "O," operating limitations, for our specified general aviation aircraft starts getting a little complicated.

WHAT IT MEANS TO BE PIC

Let's review some basic rules before we discuss the our "O" requirement. FAR §91.3, Responsibility and authority of the pilot in command, states in part, "(a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft."

Again, this rule is simple and pretty straight forward. The pilot in command (PIC) is responsible for the safe operation of the aircraft. Period.

Then §91.7, Civil aircraft airworthiness, makes two very basic and far reaching statements. It says in part, "(a) No person may operate a civil aircraft unless it is in an airworthy condition." Then it states, "(b) The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when unairworthy mechanical, electrical, or structural conditions occur." This rule now makes the PIC responsible for determining if the aircraft is in an airworthy condition for a safe flight and what the pilot must do if an unairworthy condition occurs.

Keep this requirement in mind.

CIVIL AIRCRAFT FLIGHT MANUAL, MARKING, AND PLACARDS

FAR §91.9, Civil aircraft flight manual, marking, and placard requirements, spells out what modern aircraft must contain. The rule states in part that, "(a) Except as provided in paragraph (d) of this section, no person may operate a civil aircraft without complying with the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual, markings, and placards, or as otherwise prescribed by the certificating authority of the country of registry."

Section (b) of §91.9 then states, "No person may operate a U.S.-registered civil aircraft-(1) For which an Airplane or Rotorcraft Flight Manual is required by §21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof. (2) For which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof."

FLIGHT RULES: FAR §91.103—PREFLIGHT ACTION

This rule says simply that "Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight." This information must include-(in part) "(b)(1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and (2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature."

This FAR section combined with the previous FAR sections details what actions a PIC is expected to comply with as part of his or her preflight actions. The rules say who is responsible for finding the information to ensure the aircraft is airworthy, where to start to find that information (such as in a flight manual or even something as simple and basic as a operating placard), and what the extent of that information should be. In other words all available information. This preflight rule even includes the first use of the concept of aircraft performance and gross weight because both are related to safely operating an aircraft and operating that aircraft within its operating limitations.

SHORT REVIEW

The preceding FAR sections established the operating requirements that cover most of the "AROW" acronym. In our response to AOPA, we even included various references to FAR Part 23, Airworthiness standards: Normal, utility, acrobatic, and commuter category airplanes. AOPA responded by asking what about those aircraft that don't have FAA approved flight manuals with the necessary operating limitations listed in FAR §23.1583, Operating limitations. The required limitation data includes weight and center of gravity.

At this point we thought we had answered AOPA's question. Wrong! Nothing is simple in Washington. This was one of those times. The technical specialist responded with, "Thanks for the response. We're close, but not quite there." He went on to say, "23.1583 (c and d) establish what the manufacturer has to tell me about weight and balance in the manual, but plenty of airplanes don't have and never did have manuals. Which regulation establishes the information that I have to have in the airplane pertaining to weight and balance information?

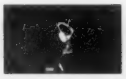
It was back to the proverbial drawing boards, or in the case of this writer, back to the keyboard, regulations, and subject matter experts for more information.

AROW: WHAT GOES UP MUST COME DOWN

He is correct. Many older aircraft didn't have the operating information that newer models are required to have. One of the reasons for the newer manual requirements was the lack of uniformity and information in previous aircraft operating manuals. So a new manual format was introduced to help pilots find similar operating data in specified sections of FAA approved aircraft flight manuals. Today, FAA approved Airplane or Rotorcraft Flight Manuals are serialized for a given aircraft and must be kept current. Many of the older aircraft may have had a generic operating manual that was not developed for a specific aircraft. It was up to the pilot to review the aircraft's type certificate data sheet or maintenance logs to ensure that the data for that specific aircraft was being use when determining the various operating limitations. For example, only the latest weight and balance data for an aircraft must be used in determining its performance data and limitations.

Also, as the more modern aircraft were being produced, the simpler flight systems and operating equipment became more complex necessitating more complete flight information. Gone were the simplier days of the classic Piper J3 *Cub* and similar aircraft. Today's home microwave ovens have more detailed operating instructions than some older aircraft. There may be more people alive today who know how to fly a J3 Cub than there are who can program their home VCR or set its clock.

But even those simplier aircraft of what some people have referred to as aviation's "Golden Age" had to meet certain certification requirements. Those requirements were outlined in the various type certificate data sheets (TCDS) issued by the FAA's predecessor, the Civil Aeronautics Administration (CAA). Like now, those older aircraft had to conform to the government's approved type certifi-



cate for that particular make and model of aircraft which for many was Civil Air Regulation (CAR) 3. Once produced, for those aircraft to remain airworthy, their owners/operators had to maintain and operate their aircraft in a condition as required by the manufacturer in its various manuals and operating limitations provided by the manufacturer as part of the TCDS.

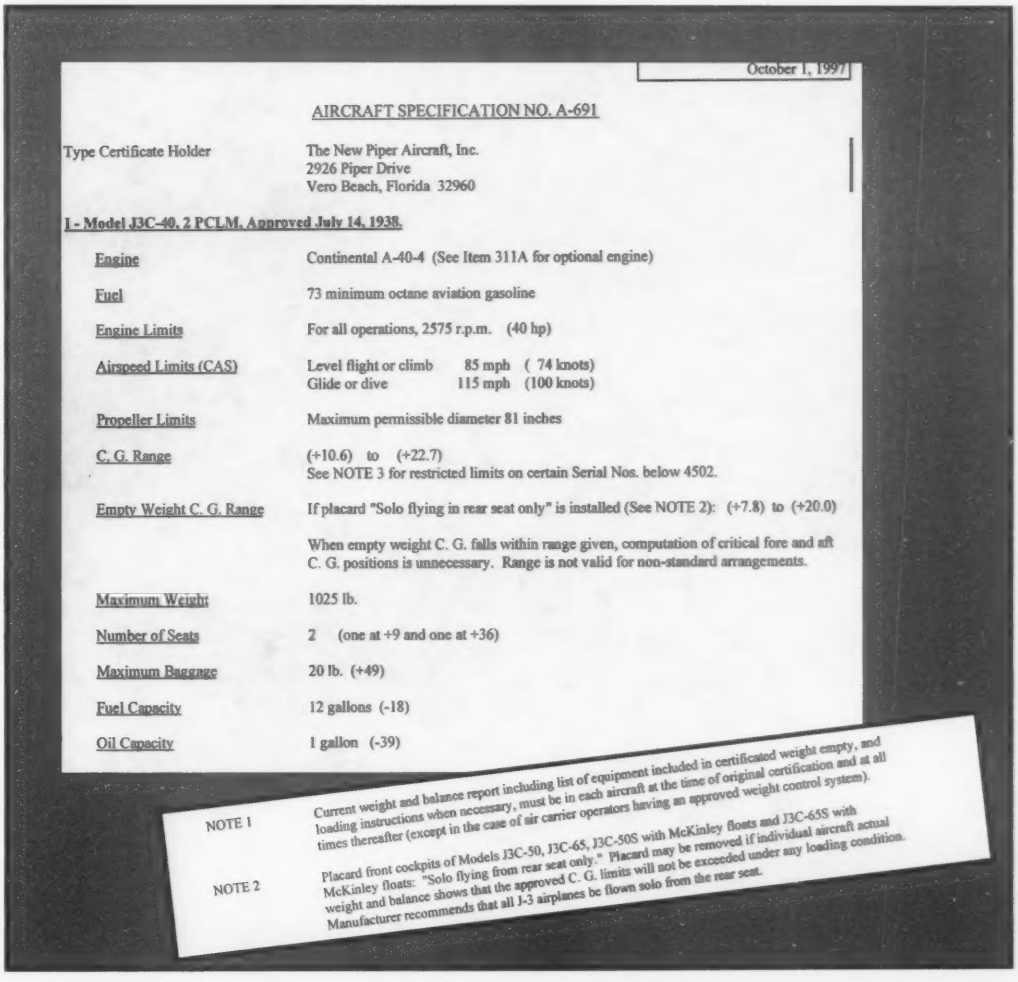
PIC OF OLDER AIRCRAFT

Now enter a pilot of such a vintage aircraft. As we outlined at the beginning of this article, the PIC is responsible for ensuring that an aircraft is airworthy before a flight. One way to check that an aircraft is airworthy in addition to meeting all of the maintenance related requirements is to operate that aircraft within the operating limitations outlined in the aircraft's type certificate data sheet. Simply stated, an aircraft must be operated in accordance with the information provided by its manufacturer and approved by an appropriate government agency as contained in the aircraft's approved type certificate or as subsequently modified with appropriate government approval. That is why when new equipment is added to an aircraft or old equipment removed, a new weight and balance calculation must be made by someone approved and qualified to do the work.

Each aircraft's type certificate data sheet includes approved weight and balance information as well as other operating limitations to ensure its airworthiness and conformity to its type certificate. A PIC is responsible for ensuring that the aircraft meets and is operated within the aircraft's type certificate specifications. Whew!

Add in the FAR requirement for "all available" information, and you have the basis for the W in the regulations of both FAR Parts 21, 23, and 91. It is too bad that FAR Part 91 regulations just don't require that current weight and balance data be required in an aircraft like the aircraft's airworthiness and registration forms are required. It would have saved a lot of work here at the office. But then maybe, general aviation pilots operating under FAR Part 91 are better off without the hard requirement like those contained in the other parts of the FAR.

In those sections, commercial operators are required to fill out weight and balance data forms for each flight and keep that data for specific periods of time. Is this level of recordkeeping necessary before you take off in your Mark I single-engine aircraft to buy that proverbial $100.00 hamburger? You own the aircraft. You weigh the same. The fuel level is full. And nothing has been added or removed from the aircraft since its last flight yesterday when you calculated the weight and balance. Do you need to recalculate it again today on a special form that needs to be filed and retained for possible FAA review? Or is the fact that you reviewed your weight and balance data as part of your performance calculations for takeoff enough? What do you think? Enjoy the burger.



October 1, 1997

AIRCRAFT SPECIFICATION NO. A-691

Type Certificate Holder	The New Piper Aircraft, Inc. 2926 Piper Drive Vero Beach, Florida 32960
1 - Model J3C-40, 2 PCLM, Approved July 14, 1938.	
Engine	Continental A-40-4 (See Item 311A for optional engine)
Fuel	73 minimum octane aviation gasoline
Engine Limits	For all operations, 2575 r.p.m. (40 hp)
Airspeed Limits (CAS)	Level flight or climb 85 mph (74 knots) Glide or dive 115 mph (100 knots)
Propeller Limits	Maximum permissible diameter 81 inches
C. G. Range	(+10.6) to (+22.7) See NOTE 3 for restricted limits on certain Serial Nos. below 4502.
Empty Weight C. G. Range	If placard "Solo flying in rear seat only" is installed (See NOTE 2): (+7.8) to (+20.0) When empty weight C. G. falls within range given, computation of critical fore and aft C. G. positions is unnecessary. Range is not valid for non-standard arrangements.
Maximum Weight	1025 lb.
Number of Seats	2 (one at +9 and one at +36)
Maximum Baggage	20 lb. (+49)
Fuel Capacity	12 gallons (-18)
Oil Capacity	1 gallon (-39)

NOTE 1 Current weight and balance report including list of equipment included in certificated weight empty, and loading instructions when necessary, must be in each aircraft at the time of original certification and at all times thereafter (except in the case of air carrier operators having an approved weight control system).

NOTE 2 Placard front cockpits of Models J3C-50, J3C-65, J3C-50S with McKinley floats and J3C-65S with McKinley floats: "Solo flying from rear seat only." Placard may be removed if individual aircraft actual weight and balance shows that the approved C. G. limits will not be exceeded under any loading condition. Manufacturer recommends that all J-3 airplanes be flown solo from the rear seat.

Some practical facts about vitamins

by Glenn L. Stoutt, Jr., MD

Vitamins are substances vital for biochemical reactions in the body. Forget about all the chemistry and biology. We need an answer to the following question: Does (as we have been told over and over) an adequate, balanced diet provide all the vitamins and minerals needed in the otherwise healthy person?

At present, neither The American Heart Association nor The American Cancer Society has formally recommended vitamin or mineral supplements. The prevailing conventional wisdom from many experts says that diet is enough. However, there is much more to consider.

How many people actually eat an adequate, balanced diet every day or even most days? This theoretical, optimum diet would be loaded with fresh fruits and vegetables, plenty of whole grain breads and cereals, low-fat dairy products, skinless poultry, fish, and lean meats that are low in saturated fat and cholesterol--and includes foods with plenty of fiber and minerals. But our typical diet might include fruits on Monday and then no more until Saturday; vegetables once a week; fast-food meals six times a week; cereal one morning; fish on Friday; a candy bar and peanut butter and crackers from a vending machine on Saturday, five colas a week; and too many alcoholic drinks on weekends. So, really, there is no way most of us would get the needed amount of vitamins.

Standards

- MDR refers to the Minimum Daily Requirement
- RDA to the Recommended Daily Requirement
- RDI to the Reference Daily Intake
- ODA means Optimum Daily Allowance
- DV refers to the Daily Value.

Help! Where do all these confusing standards come from? Various groups developed recommendations that turn out to be based on unrealistic statistical norms, overlooking individual differences.

Actually, the minimum daily requirement refers to the absolute minimum amount one needs of the vitamin, a bare-bones amount that will keep you from getting a vitamin deficiency, say scurvy from lack of vitamin C or rickets from lack of vitamin D.

True, in medical practices in the United States, vitamin deficiency diseases are almost non-existent. But, what about problems resulting from marginal intake of vitamins--from being close to "running on empty?"

Do we need more--or in the case of vitamin C, much more--than the recommended amounts? How much does one need for optimum health?

The "just eat right" suggestion overlooks vast differences in age, sex, weight, lifestyle, activity, health, heredity, stress, climate, and individual biochemistry.

Much present-day thinking is that these recommendations should be changed. Vitamins may do much to prevent heart disease, cancer, and aging, plus help to keep us active, feeling good, and in optimum health. So, do we need vitamin supplements?

Many experts now think so. Of course, at the basis of all discussions of vitamins and minerals is the assumption that we must eat a healthful, balanced diet--as the first step toward good health. Supplemental vitamins are the second step.

Reasons vitamin Supplements Are Recommended:

- The B vitamins folic acid, B6, and B12 lower homocysteine levels in the blood. New studies indicate that elevated homocysteine may promote atherosclerosis and blood vessel damage as much as cholesterol. Inexpensive tests for homocysteine will soon be available.
- It's now generally accepted that heavy accumulation of free radicals that result from our body's metabolism and energy use can damage healthy cells. These agents can contribute to cardiovascular disease, cancer, cataracts, aging, arthritis, and damage to our DNA. This toxic damage can be lessened by antioxidants. The three major antioxidants are vitamin C, vitamin E, and betacarotene.

Kenneth H. Cooper, MD, health and fitness guru, and author of *Aerobics,* has written an entire book devoted to this subject. He noted that many athletes who overtrained (high-intensity, exhaustive exercise) succumbed to heart attacks and cancer. He theorized that the overexertion produced high levels of free radicals, which then injured cells lining the arteries, contributed to other cells becoming cancerous. He now recommends low-intensity exercise to replace the killer-paced regimens that many feel a compulsion to perform. As a part of our regular health program, his book advises adults to have a daily "cocktail" of the three antioxidants.

Natural Sources of Antioxidants, Supplements, and Daily Needs

For vitamin C, the answer is pretty easy. Most fruits and vegetables contain plenty of C (also called ascorbic acid). Take more than the recommended minimum allowance of about 60 milligrams (mg) a day that one can easily get from your diet. Dr. Cooper suggests taking a supplement of at least 500 mg per day. Costs about two cents a day.

You just can't get enough vitamin E from your diet. It is in vegetables, wheat germ, and vegetable oils such as safflower, corn, and sunflower. The animal products that are high in vitamin E also contain high fat, so this is not such a

good choice. A reasonable supplemental dose is 400 International Units (IU). Get natural vitamin E--it will say d-alpha tocopherol (or -yl) on the bottle.

With beta carotene dietary intake is the answer and the food choices make it easy. A large carrot and a large sweet potato--they each have very high levels—give you way over Dr. Cooper's recommendation of 25,000 I.U. daily.

A carrot has almost 25,000 I.U., and a baked sweet potato contains about 20,000 I.U.--the next closest foods have only about a third as much. So, get more bang for the buck by choosing sweet potatoes and carrots. Beta carotene is found in yellow and dark green vegetables. They are "color coded" by nature--making selections easy: carrots, sweet potatoes, pumpkins, yellow corn, spinach, kale, turnip greens, collards, winter squash, cantaloupes, oranges, and apricots.

Recent studies have shown that only natural beta carotene seems to have full protective effect, so you can probably omit this antioxidant from your shopping list. (Beta carotene is one of the precursors of vitamin A.)

The antioxidants vitamin C, beta-carotene (part of the vitamin A complex), and vitamin E help prevent many chronic diseases, including heart disease, cancer, cataracts, aging, depressed immune system, and DNA damage. They reduce levels of the toxic free-radicals that are produced by all biochemical reactions in the body.

So, what's the bottom line on vitamins and mineral supplements? To a healthful, balanced diet loaded with deeply-colored (carrots, oranges, spinach, cantaloupe, apples) fruits and vegetables, add:

- One multivitamin/mineral tablet a day
- 500 mg of vitamin C
- 400 IU of vitamin E
- 1000-1500 mg of calcium (to prevent bone loss through osteoporosis)

Factoids

- A good multiple vitamin with minerals (generic) costs about three cents a day. You can get this, all the antioxidants, calcium (1000 mg), and a baby aspirin or equivalent (81 ma) for a total of 17 cents a day, or a little over five bucks a month.
- A little-known secret: Only a few companies, maybe four or five, make vitamins. They sell carloads of bulk vitamins to thousands of stores, who repackage them and sell them under their own brand name. So, the same batch of multivitamin/supplements may be sold under dozens of brand names and at many different prices. Generics cost much less than the name brand (fewer advertising dollars) but are exactly the same thing. A rule of thumb is to never spend over $10 a month for supplements. Avoid subscribing to expensive rip-off programs that send you a box of supplements costing enough money to start payments on a small car. The generic form sells for much less. Most supermarkets and discount stores carry their own line of reputable vitamins and supplements. Some companies offer "designer" vitamins and food supplements for an exorbitant cost. Don't get ripped off. Stay with the basics.
- If you are taking anticoagulants or large amounts of aspirin-the standard adult aspirin is 325 mg--don't take vitamin E without consulting your physician. Vitamin E is a natural anticoagulant.
- Natural vitamins have no advantage over synthetic ones, with the possible exception of vitamin E and beta carotene (part of vitamin A).
- Natural vitamin E is slightly more expensive, but is probably better than the synthetic form. One large carrot or one sweet potato daily will give you plenty of beta-carotene.
- Avoid the marketing ploys of such creative label prefixes as stress-, silver-, gold-, extra strength-, high potency-, vitamin C from rose hips, therapeutic formulas, or such. The only special vitamin/mineral supplements are those given to pregnant or nursing women.
- The minerals listed on the bottle label should include (at least) iron, zinc, calcium, selenium, iodine, magnesium, chromium, and copper.
- Chewable vitamin C (ascorbic acid) over the years might do a number on the enamel of your teeth. Just get plain vitamin C.
- The fat-soluble vitamins (A, D, E, and K) are stored in the body for a much longer time--for months--than the water-soluble ones, which can last for only a few weeks at most. The bad news is that the fat-soluble vitamins could, in massive doses, accumulate to a dangerous level. This is especially true of vitamins A and D, which in huge doses can actually be so toxic as to cause illness and even death. As in most things, more is not necessarily better.
- Take your vitamin/mineral supplements with meals for better absorption.
- On the label, mg means milligram, or a thousandth of a gram; mcg refers to microgram, or a millionth of a gram; I.U. means International Unit. While reading the label, make sure the product has not expired or will expire before you use all of it.

I can't see that any valid objection could be made to this schedule. It is a reasonable choice between the timid advice of the diet only people and the megadoses recommended by some people. People taking adequate vitamins are unquestionably healthier than those who do not. I personally think these recommendations are both safe and reasonable, and should answer the question, "Should I take vitamin/mineral supplements?"

Yours for good health and safe flying.

+

Note: The views and recommendations made in this article are those of the author and not necessarily those of the Federal Aviation Administration.

Dr. Glenn R. Stoutt, Jr., is a partner is the Springs Pediatrics and Aviation Medicine clinic, Louisville, Ky., and has been an active FAA Aviation Medical Examiner for 37 years. No longer an active pilot, he once held a commercial pilot's license with instrument, multiengine, and CFI ratings.

This article originally appeared in the Federal Air Surgeon's Medical Bulletin, Summer 1998.

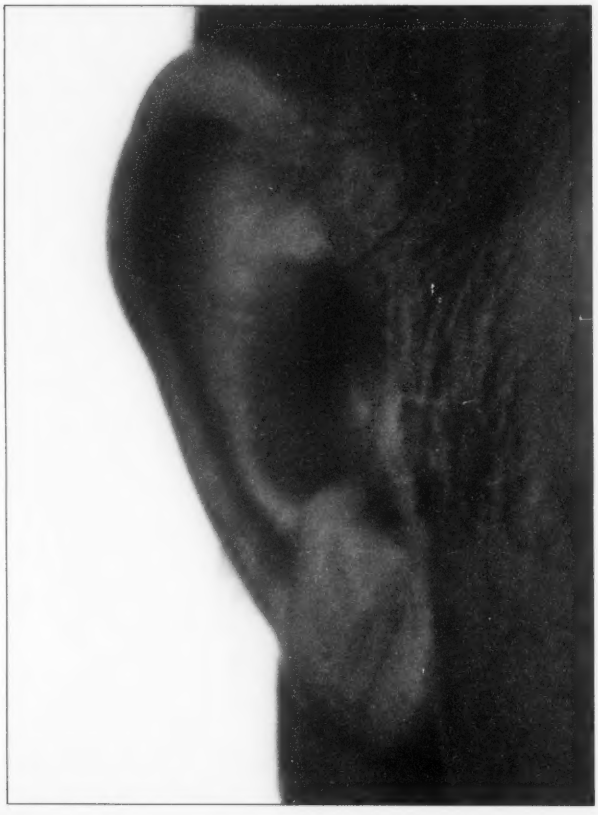
Hearing and Noise in Aviation

by Melchor J. Antuñano, MD, and James P. Spanyers

The term hearing describes the process, function, or power of perceiving sound. Hearing is second only to vision as a physiological sensory mechanism to obtain critical information during the operation of an aircraft. The sense of hearing makes it possible to perceive, process, and identify among the myriad of sounds from the surrounding environment.

Anatomy and Physiology of the Auditory System

The auditory system consists of the external ear, ear canal, eardrum, auditory ossicles, cochlea (which resembles a snail shell and is filled with fluid), and the auditory nerve.



Ambient sound waves are collected by the external ear, conducted through the ear canal, and cause the eardrum to vibrate. Eardrum vibration is mechanically transmitted to the ossicles, which, in turn, produce vibration of a flexible window in the cochlea. This vibration causes a pressure wave in the fluid located inside the cochlea, moving thousands of hair-like sensory receptors lining the inner walls of the cochlea. The movement of these receptors resembles the gentle movement of a crop field caused by the wind. The stimulation of these sensors produces an electrical signal that is transmitted to the brain by the auditory nerve. This signal is then processed by the brain and identified as a particular type of sound.

Sound

The term *sound* is used to describe the mechanical radiant energy that is transmitted by longitudinal pressure waves in a medium (solid, liquid, or gas). Sound waves are variations in air pressures above and below the ambient pressure. From a more practical point of view, this term describes the sensation perceived by the sense of hearing. All sounds have three distinctive variables: frequency, intensity, and duration.

Frequency is the physical property of sound that gives it a pitch. Since sound energy propagates in a wave-form, it can be measured in terms of wave oscillations or wave cycles per second, known as hertz (Hz). Sounds that are audible to the human ear fall in the frequency range of about 20-20,000 Hz, and the highest sensitivity is between 500 and 4,000 Hz. Sounds below 20 Hz and above 20,000 Hz cannot be perceived by the human ear. Normal conversation takes place in the frequency range from 500 to 3,000 Hz.

Intensity is the measurement of pressure, or loudness. The decibel (dB) is the unit used to measure sound intensity. The range of normal hearing sensitivity of the human ear is between -10 to +25 dB. Sounds below -10dB are generally imperceptible. A pilot who cannot hear a sound unless its intensity is higher than 25 dB (at any frequency) is already experiencing hearing loss.

Duration determines the quality of the perception and discrimination of a sound, as well as the potential risk of hearing impairment when exposed to high intensity sounds. The adverse consequences of a short-duration exposure to a loud sound can be as bad as a long-duration exposure to a less intense sound. Therefore, the potential for causing hearing damage is determined not only by the duration of a sound but also by its intensity.

Noise

The term *noise* refers to a sound, especially one which lacks agreeable musical quality, is noticeably unpleasant, or is too loud. In other words, noise is any unwanted or annoying sound. Categorizing a sound as noise can be very subjective. For example, loud rock music can be described as an enjoyable sound by some (usually teenagers), and

at the same time described as noise by others (usually adults).

The aviation environment is characterized by multiple sources of noise, both on the ground and in the air. Exposure of pilots to noise became an issue following the introduction of the first powered aircraft by the Wright brothers and has been a prevalent problem ever since. Noise is produced by aircraft equipment-powerplants, transmission systems, jet efflux, propellers, rotors, hydraulic and electrical actuators, cabin conditioning and pressurization systems, cockpit advisory and alert systems, communications equipment, etc. Noise can also be caused by the aerodynamic interaction between ambient air (boundary layer) and the surface of the aircraft fuselage, wings, control surfaces, and landing gear. These auditory inputs allow pilots to assess and monitor the operational status of their aircraft. All pilots know the sounds of a normal- functioning aircraft. On the other hand, unexpected sounds or the lack of them, may alert pilots to possible malfunctions, failures, or hazards. Every pilot has experienced a cockpit or cabin environment that was so loud that it was necessary to shout to be heard. These sounds not only make the work environment more stressful but can, over time, cause permanent hearing impairment. However, it is also important to remember that individual exposure to noise is a common occurrence away from the aviation working environment-at home or work, on the road, and in public areas. The effects of pre-flight exposure to noise can adversely affect pilot in-flight performance.

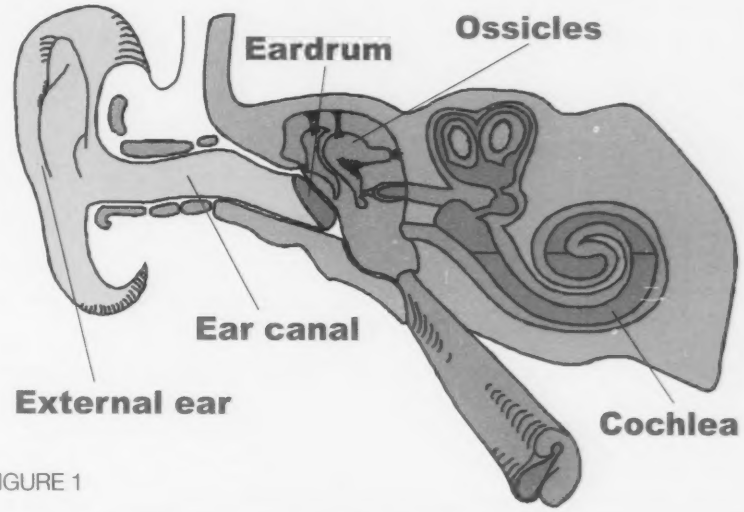


FIGURE 1

Types of Noise

- *Steady:* Continuous noise of sudden or gradual onset and long duration (more than one second). Examples: aircraft powerplant noise, propeller noise, and pressurization system noise. According to the Occupational Safety and Health Administration (OSHA), the maximum permissible continuous exposure level to steady noise in a working environment is 90 dB for eight hours.
- *Impulse/Blast:* Noise pulses of sudden onset and brief duration (less than one second) that usually exceed an intensity of 140 dB. Examples: firing a handgun, detonating a firecracker, backfiring of a piston engine, high-volume squelching of radio equipment, and a sonic boom caused by breaking the sound barrier. The eardrum may be ruptured by intense levels (140 dB) of impulse/blast noise.

Effects of Noise Exposure

Physiological

- Ear discomfort may occur during exposure to a 120 dB noise.
- Ear pain may occur during exposure to a 130 dB noise.
- Eardrum rupture may occur during exposure to a 140 dB noise.
- Temporary hearing impairment. Unprotected exposure to loud, steady noise over 90 dB for a short time, even several hours, may cause hearing impairment. This effect is usually temporary and hearing returns to normal within several hours following cessation of the noise exposure.
- Permanent hearing impairment. Unprotected exposure to loud noise (higher than 90 dB) for eight or more hours per day for several years, may cause a permanent hearing loss. Permanent hearing impairment occurs initially in the vicinity of 4,000 Hz (outside the conversational range) and can go unnoticed by the individual for some time. It is also important to remember that hearing sensitivity normally decreases as a function of age at frequencies from 500 to 6,000 Hz, beginning around age 30.

Psychological

- Subjective Effects: Annoying high-intensity noise can cause distraction, fatigue, irritability, startle responses, sudden awakening and poor sleep quality, loss of appetite, headache, vertigo, nausea, and impair concentration and memory.
- Speech Interference: Loud noise can interfere with or mask normal speech, making it difficult to understand.
- Performance: Noise is a distraction and can increase the number of errors in any given task. Tasks that require vigilance, concentra-

tion, calculations, and making judgments about time can be adversely affected by exposure to loud noise higher than 100 dB.

How to Protect Your Hearing

Limiting Duration of Exposure to Noise: OSHA-established permissible noise exposure limits for the workplace (Fiugure 2) (including the cockpit of an aircraft).

Noise Intensity (dB)	Exposure Limit (hrs. per day)
90	8
92	6
95	4
97	3
100	2
102	1.5
105	1
110	0.5
115	0.25

FIGURE 2

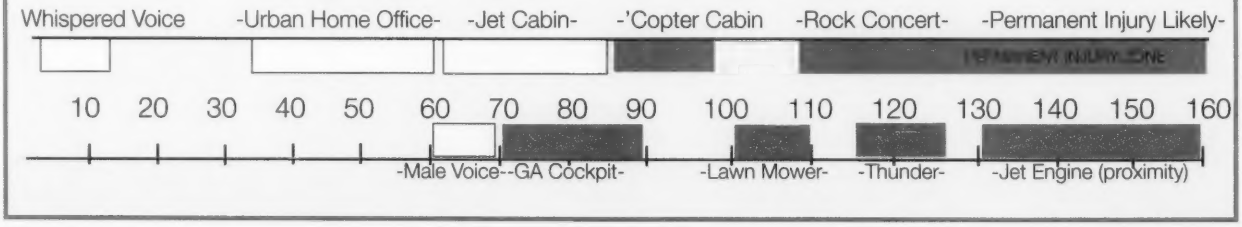
Use Hearing Protection Equipment. If the ambient noise level exceeds OSHA's permissible noise exposure limits, you should use hearing protection devices-earplugs, earmuffs, communication headsets, or active noise reduction headsets. Even if an individual already has some level of permanent hearing loss, using hearing protection equipment should prevent further hearing damage. These protection devices attenuate noise waves before they reach the eardrum, and most of them are effective at reducing high-frequency noise levels above 1,000 Hz and/or for reducing noise levels to, or below, 50 dB. It is very important to emphasize that the use of these devices does not interfere with speech communications during flight because they reduce high-frequency background noise, making speech signals clearer and more comprehensible.

- *Earplugs.* Insertable-type earplugs offer a very popular, inexpensive, effective, and comfortable approach to provide hearing protection. To be effective, earplugs must be inserted properly to create an air-tight seal in the ear canal. The wax-impregnated moldable polyurethane earplugs provide an effective universal fit for all users and provide 30 to 35 dB of noise protection across all frequency bands.
- *Communication Headsets.* In general, headsets provide the same level of noise attenuation as earmuffs, and are also more easily donned and removed than earplugs, but the microphone can interfere with the donning of an oxygen mask.
- *Active Noise Reduction Headsets.* This type of headset uses active noise reduction technology that allows the manipulation of sound and signal waves to reduce noise, improve signal-to-noise ratios, and enhance sound quality. Active noise reduction provides effective protection against low-frequency noise. The electronic coupling of a low-frequency noise wave with its exact mirror image cancels this noise.
- *Combinations of Protection Devices.* The combination of earplugs with earmuffs or communication headsets is recommended when ambient noise levels are above 115 dB. Earplugs, combined with active noise reduction headsets, provide the maximum level of individual hearing protection that can be achieved with current technology. [Editor's Note: Be careful you don't muffle too much engine noise when you combine ear protection devices. You still want to hear enough to know if the engine quits.]

This article is adapted from a pamphlet of the same name in the series "Medical Facts for Pilots," developed by FAA's Civil Aeromedical Institute. If you want additional copies or more information on hearing, contact CAMI's Aeromedical Education Division, AAM-400, P.O. Box 25082, Oklahoma City, OK 73125.

Dr. Antuñano manages CAMI's Aeromedical Education Division; Mr. Spanyers is a physiology instructor in

Source of Sound/Noise and Intensity (in decibels)



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When Can You Be Too Heavy?

The December 1997 issue of CALLBACK, the FAA-sponsored, NASA Aviation Safety Reporting System's newsletter contained the following "heavy weight" story. ("No," we are July 4 picnic need to diet.)

The information in the story is a good example of how we can all take certain things for granted. As we start a summer of flying, the article is a good reminder that nothing can be taken for granted in aviation.

The Bod Squad

Air carrier crews can find their aircraft overloaded when cabin weights are incorrectly calculated--or estimated--by company dispatch. A Captain tells of the flight of his "heavy" aircraft, a B-727 laden with a football team.

The aircraft papers indicated that the aircraft would be just 100 lbs. or so below it maximum structural gross weight for takeoff. Takeoff was done with an abnormally long ground roll, and climb performance was marginal both dirty and cleaned up. Flight was planned for FL310. At about FL260, rate of climb was less than 500 feet per minute. The aircraft could not make it to FL310 and stayed at FL260. When I rechecked the weight and balance, I saw that we had 100 passengers, and that "normal" passenger-plus-carry-on weight of 212 lbs. was used to calculate cabin weight. I watched these guys disembark; they are gigantic, and all carried very large equipment duffel bags. I think the aircraft was a good 8,000-10,000 lbs. over planned weight, and far in excess of structural gross weight.

Abnormal passenger loads--troops, football teams, sumo wrestlers, etc.--should require actual weights for dispatch.

The reporter's point is relevant to both the previous report and this incident; the use of "average" weights for passengers, luggage, and carry-on items can lead to gross inaccuracies in calculating gross weight.

FAA Aviation News Comment

The above ASRS article points out the need to always calculate the weight and balance for non-normal aircraft loading. Although few four-place GA single-engine aircraft are going to carry a football team with all of its gear, pilots of small aircraft need to check their aircraft's weight and balance when taking off with full fuel, all seats filled, and bags in the storage areas. In such cases, small aircraft are especially vulnerable to being overloaded because many aren't designed to carry full fuel with a full passenger load and bags.

Pilots of small aircraft also have a unique problem that airlines seldom have. How do you ask an in-law's weight? And when was the last time anyone saw a set of scales on the flight line at a fixed-based operator? Throw in a set or two of golf clubs, and gross weight limits can be exceeded very quickly.

Then, as we get into the high heat of summer and the related problems of high density altitude, pilots need to be aware of how critical it can be to have accurate numbers when calculating weight and balance data as well as density altitude data. Both are needed when operating at or near the limits of an aircraft's performance capabilities.

The Airplane That Could—Almost

by Patricia Mattison

David Clemmer photo

Once upon a time, a long time ago, there was a little airplane that could do anything--almost. No, this is not a fairy tale about an airplane, but rather a story about what happened to me and the airplane that I owned at the time.

I had been on a business trip with a friend and had also taken my daughter along for the weekend. We were on the return trip leg of the journey and almost at our destination of San Diego, when we encountered severe turbulence and rotor waves that were completely unforecast.

Suddenly, we were lifted like an express elevator then dropped and rolled inverted. This maneuver was repeated several times before mother nature turned us loose and allowed controlled flight to return. I immediately canceled my flight plan to San Diego and flew, very carefully I might add, to Imperial Airport.

Once at Imperial Airport, I had the airplane looked over thoroughly, and then hired a pilot to fly the airplane back to San Diego for me. There was paint missing from the rivets three rows from the wing root, which led me to believe that some damage might have occurred internally. The mechanic at Imperial said that he felt the airplane was safe to fly but didn't have the equipment to properly inspect the area and search for internal stress fractures. The airplane made it safely to San Diego where I had the wings inspected again.

In retrospect, I probably should have reported this as an incident to the FAA but I didn't. I, my passengers, and the mechanic were the only people that knew that the situation had happened. Later on I put that bit of excitement out of my mind and continued to fly the airplane for another year before it was sold.

The airplane changed hands several times over the years. I had no idea who had it until I began to look around for the plane to see if it was going to be sold again. I thought I just might buy it back. I discovered who the most recent owner was and decided to give him a call.

The present owner is an older man who is a retired Navy aircraft carrier pilot. I visited with him by phone, and he loves the plane. Darn the bad luck. During our conversation he said that he loved to do aerobatics. The red light went on in my head. He said that he also owned a Citabria, and my heart rate went back to normal.

I told him about the incident several years ago, and he said that he would have his mechanic look at the wing structure and connecting bolts. My conscience was on pins and needles. Fortunately, everything checked out just fine. He was very grateful to hear about my part of the history of the aircraft and thanked me for my concern.

Airplanes are bought and sold all the time without the new owner being aware of situations that could have caused damage structurally. For the most part it is done through ignorance. Occasionally, the seller intentionally keeps such facts from a buyer in order to complete the sale. Most of the time though the seller is not aware of the possible over stressing situation that may have occurred.

Logbooks somehow get misplaced and can be reconstructed, usually by the mechanic who worked on that aircraft. But what about past history? Sometimes important information is overlooked. If you plan on buying an airplane in the future have a competent mechanic that you trust go over the plane with a fine tooth comb before you buy it.

As the small airplane fleet becomes older, more problems arise due to overstressing and corrosion. These flaws are normally detected at an annual or 100 hour inspection. Bring any concerns about overstressing to the attention of your mechanic. Flying, for the most part, is safer than any other form of transportation. Enjoy the experience in an airplane that is well maintained.

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Patricia Mattison is the Safety Program Manager at the Juneau Flight Standards District Office

Don't let Static Do This to You!

By Martin Hale

I was in Fairbanks, AK, in September of 1997 filling my Cessna 180 on floats with a plastic, approved gasoline can and using a plastic funnel lined with a chamois when a fellow pilot stopped by. Doug has been in aviation most of his life, from airplane mechanic to retiring as a captain for Wien Air Alaska, and he is still flying! As Doug watched me fueling he commented, "You know, you shouldn't be pouring fuel that way. I've seen two float planes catch fire by static electricity!"

That definitely got my attention! I had heard and read about the dangers of static electricity but had never fully understood what causes the problem in a fueling situation. After a direct warning from such an experienced pilot, I was very apprehensive about fueling from plastic containers, and, being a pilot on straight floats, I am dependent on fueling with cans a great deal. I started asking questions at every fuel stop and to every pilot I came into contact with about their knowledge of the static electricity problem. Almost everyone had the same comments, "Yes, I know of the potential problem, but I don't really understand it." or, "Yes, I know there could be a problem, but I have always fueled with plastic and never had a problem so the risk must be small." These answers did nothing to lessen my apprehension. I decided to do some investigating on what the dangers of static electricity are and how we might be able to prevent possible fires.

Static electricity is a fairly common phenomenon. Its danger lies in the fact that it is an invisible, silent enemy that is often unpredictable. Even certain weather conditions can affect the build up of static: thunderstorms, cold and dry or hot and dry conditions may increase the risk of a problem. Static is non-hazardous unless it builds up under given conditions to the point that it makes a spark and ignites your fuel. This situation usually occurs as aviation fuel is being poured into an airplane. While there can be a static problem when fueling from both metal and plastic cans, it appears there is a greater risk while using plastic. In fact, some of the fuel truck drivers I spoke to said they are not supposed to fill and use plastic cans at all! However, most of them admitted doing it anyway "because everyone uses plastic cans."

I started my research by trying to determine just how the static forms when pouring from a can into a funnel. My first call was to an aviation fuel sales representative for Exxon in Montana. He sent me copies of the National Fire Protection Agency's bulletins #407 Aircraft Fuel Servicing, and #77 Static Electricity. I found these publications to be very helpful, and I would recommend them to those who are interested in this subject.

Next, I looked up the guy who got me started on this mission, Doug Millard. Doug put on his track shoes and went in search of an old FAA film that he had seen on the subject. He soon learned that the FAA had thrown out all their old films years ago. However, they remembered that someone had taken that particular film and perhaps it could still be around. Doug didn't give up hope. He kept searching and found the fellow who had the films! The Alaska Safety Foundation then helped us by converting the films into VCR tapes. The film is very helpful in demonstrating how static electricity forms in different situations.

The more that I learned about static electricity, the more it became clear to me that this a problem that has many interesting and complex issues. As intriguing as all the technical facts are, I wanted to focus on how we can prevent fires while fueling our planes from cans, especially plastic cans and funnels since these are what many of us rely on in our flying practices. Metal cans would be the safest choice in fueling because they are easily bonded, thus produce less risk. However, due to their weight they are often not a viable option for most of us. (I weighed both a metal and a plastic can: the plastic can weighed three pounds and the metal can weighed eight pounds.) Many pilots see the words "Gasoline Approved" on their plastic fuel cans and believe everything is okay, but this approval does not pertain to any risks associated with static electricity! The statement only claims that the given container is colored red and will hold gasoline securely without leaking or breaking.

Static electricity becomes a problem when fuel is poured through the air and splashes into a funnel, especially a plastic funnel. By using a spout on your can that is long enough to allow the fuel to enter the tank under the existing fuel level it will reduce the opportunity for the static to build up. A promising product is a siphon hose that allows you to siphon from the bottom of your can into the bottom of the existing fuel in your tank. This would work great if you are using filtered fuel from a clean can and do not have to use a filtered or screened type can. In addition, it is important to note that when using a funnel, it should be made of a material that is a conductor of electricity. There is less of an opportunity for static build up and the funnel can and should be bonded.

The National Fire Protection Agency says that using a chamois in a funnel to filter fuel is extremely hazardous because of the build up of static electricity. This suggestion is frowned upon by many pilots who fly in the North Country, particularly Alaska, who rely on chamois to filter out water and dirt from their fuel. I spoke to some of these pilots and they related that they had been using chamois for years, but that they also used metal funnels instead of plastic. While this is a very interesting debate (worthy of its

own investigation) I am going to focus on using clean fuel from filtered pumps.

One possible solution to the static problem is the use of a metal funnel or one constructed of carbon and powdered stainless steel that can conduct electricity like metal and can be bonded. One particular funnel of this type also screens contaminated fuel.

Another interesting warning comes from the National Fire Protection Agency. They warn that the build up of static electricity may occur when hauling fuel in the beds of trucks with plastic bedliners or in the backs of cars or vans that have synthetic carpeting. Cans in either of these situations while being transported should first be set on the ground before being used for fueling. This is a serious problem and many states report that they have had several fires due to this kind of situation. For example, since March 1995, in Chesterfield, Virginia six separate fires were started at service stations due to static electricity. Also, according to the Oklahoma based Petroleum Equipment Institute, 30 fires can be attributed to cans being filled with fuel while in the bed of trucks with plastic bed liners!

The more I learned about the complex nature of the static problem the more I realized that while there are many steps pilots can take to prevent a fire due to static electricity we must be prepared for such a situation. Obviously, the most important piece of equipment that we carry in our planes to fight fires is our fire extinguishers. What about your habits with this crucial piece of equipment? Is your extinguisher approved for gasoline ignited fires? Do you take it out of your plane while fueling, and keep it close at hand during the fueling process? The pilots with whom I spoke who have seen planes catch fire due to static electricity related that if they did not practically have the extinguisher in their hand at the time the fire started there would have been no way to control the blaze! An extinguisher does us absolutely no good if we cannot get to it fast!

I recently took an interesting course on the use of fire extinguishers on gasoline fires from the Helena (MT) Airport Fire Department. This course was quite the eye-opener. During this one hour course we were taught the proper use of an extinguisher as well as which ones work and which ones do not. Unfortunately, the type of extinguisher that they recommend as being the best, a large dry chemical model, is too large to carry in small planes. However, they did suggest that pilots should contact an extinguisher dealer and find out what would work best on gasoline fires and still suit our need for something compact. They also gave us a list of rules regarding the safe fueling of our planes. One rule was not to fuel from plastic cans at all! Here we go again. What are those of us to do who have planes on straight floats and do not have constant access to a fueling station?

There is not a concrete answer to the problem of fire risk due to static electricity. However, I do believe that many of the suggestions that I found can help us prevent a fire, and that is exactly why I embarked on this research. I hope that by bringing this issue to light and giving some practical suggestions, maybe a pilot out there who was not aware of this problem could be saved from the disaster of losing his plane, or worse, being injured or killed due to a fire.

This article can be summed up by some great information that was found on the Internet: "Ordinary plastic funnels/containers should never be used for refueling purposes. The materials used in the makeup of plastic 'pick up' the static charge that is in the air and help to conduct the charge across the top of the funnel, thus can cause an explosion when the fuel is poured into the funnel. The best method of transferring fuel from the container into the tank is by using a metal funnel or a funnel that conducts electricity and is fitted with a bonding wire, which is connected to the wing. This is the only method that is recognized by the aviation industry. Most floatplanes have an eyebolt connection next to the filling point. If not, a clip can be connected to your bonding wire and should be attached to a clean bonding point on the aircraft.... It's not a matter of if you will ever have a fire; it's when you will have one!"

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Martin Hale is with the Montana Seaplane Pilots Association in Whitefish, MT.

PLASTIC BUCKETS ARE PROHIBITED FOR JET FUEL TESTING

According to the FAA's Continued Airworthiness Division General Aviation Branch (AFS-340) there is another risk that involves plastic containers in the field. Industry jet fuel testing standards require fuel suppliers that use fuel trucks to service aircraft to test their trucks' fuel daily for possible contaminants in accordance with proscribed guidelines. Apparently, some suppliers may be using white plastic buckets as part of this visual test process. One industry standard, the Air Transport Association (ATA) document ATA-103 prohibits the use of plastic buckets for this test. ATA-103 specifies the use of a white enamel or a stainless steel bucket for the test. According to FAA Advisory Circular (AC) 150/5230-4, as revised, "Plastic buckets are not recommended because plastic tends to hold a slight static charge that draws particulate matter to the sides." If any particulate matter is drawn to the side of a plastic bucket, this moment would reduce the user's ability to visually detect possible contamination. Appendix 5(bb) of the AC also says in part that "...plastic may contribute to static spark potential."

Fuel suppliers should check their vehicles to ensure only approved containers are used for the required visual fuel test.

WING FLAPS

by Henry W. Davison

When used properly, wing flaps enhance the lifting characteristics of the wing at the slower speeds. "The wing is the thing--the wing is king!" Contrary to the way flaps are occasionally taught, flaps are not brakes, period! If flaps are brakes, then a chair has to be considered a brake because it stops you from going all the way down to the floor. Come to think of it, almost everything could be considered a brake. Consequently, there could be no distinction between the items in question. Therefore, let's use the correct nomenclature wherever applicable.

The focal point of this discussion is limited to three types of wing trailing edge flaps as follows: Fowler flap, split flap, and hinged flap. All three types have the same common goal of increasing or maintaining lift at slower speeds. In the approach phase, flaps increase the angle-of-descent by decreasing the closure rate over the ground to the destination, and by angling the downward thrust of air more favorable to opposing gravity. In the flaring phase, flaps convert some of the horizontal energy to vertical energy, thus reducing the sink rate to touchdown.

In this discussion, the concern is about operating the flaps beyond the first notch or increment in the approach phase. Obviously, you don't use full flaps for takeoff. Fowler flaps are the most used; therefore, the center of attention will be focused on this type.

Back to Basics

The wing gets its lift, not by Bernoulli's principle alone, but by the airflow being thrusted downward and backward, and by the equal and opposite reaction. Bernoulli's principle makes this airflow phenomenon possible by initially deflecting the airflow sharply upward, then downward. The weight of air, virtually tons for a large aircraft, plus the air velocity is proportionate to the lifting force on the wing and fuselage (lifting body) to fill the void.

In analogy to the reaction phenomenon, a train obtains forward motion by the backward push on the track, the jet engine gets forward thrust by the backward push of the exhaust, the propeller gets its forward thrust by pushing the air backward, and so on.

Airflow Diversion

When the aircraft is in the proper attitude during the approach phase with flaps extended, most of the impacted airflow is on top of the wing, fuselage, and horizontal tail surface, not on the underside of flaps, as you might expect. Granted, a much smaller amount of airflow makes its way underneath the wing. This doesn't mean that all is well, as far as the flaps are concerned, in a nose high, power approach, even when lined up with the VASI lights.

In support of the airflow impact theory, just look how fragile the 1/4 inch flap control rod and attachment bracket is on a Cessna 152 or 172. If that is not convincing enough, look at the investigation results of the commuter airliner that crashed in Indiana during a winter storm. The airliner was

in a holding pattern at reduced speed with the flaps partially deployed. Through extensive testing, it was determined that ice had formed on top of the wing and aft of the deicer boots. The ice, acting as a spoiler, rendered the aircraft uncontrollable. The final conclusion was that flaps should not be deployed in icy conditions, and the flight manuals were revised accordingly.

Once again, it is worthy of repeating that flaps modify the wing lift characteristics when deployed by altering the wing camber and by increasing the wing area, on Fowler flaps. In the approach to a landing configuration, the flaps deflect airflow more downward in opposition to gravity, plus the airflow passing through the gap between the flap and wing enhances the airflow over the top trailing edge of the wing. This reaction is how the wing achieves lift at the slower speed. The opposition to gravity of vector analysis combined with a slower horizontal closure rate, increases the angle of descent.

The reverse thrust action resulting from more direct opposition to gravity, plus induce drag, and the downward pitch of the aircraft nose, contribute to the feeling that brakes are being applied. This brake theory explanation may be acceptable for the novice passenger, but inexcusable for a pilot trainee. Contrary to many beliefs, flaps are not brakes!

The problem with using the brake theory to simplify the process destroys the authenticity of the basic concept from which it originated. Fundamentals are what we as instructors should be emphasizing; not sweeping them under the rug. Indeed, a coverup leaves room for jumping at conclusions, rather than abstracting the facts. Additionally, fundamentals are the pure essence of problem solving, situation awareness, etc. Last, but not least, a single fundamental is manifested in many applications; consequently an enhancement to the learning process, through patternization, is the reward.

Landing Flare Episode

The reserve energy established during the approach phase, by virtue of airspeed and proper attitude, pays off during the five-second flare episode. As the angle of attack increases, a sharper downward airflow controls the sink to touchdown. In essence, the flare converts some of the horizontal energy to vertical energy such as the landing flare in an airfoil type parachute.

In a low, nose high, power approach, there is no reserve energy if the engine fails. For longevity sake, avoid this situation.

Mr. Davison is an R&D Flight Instructor, ATP, and A&P.

Butane Lighters

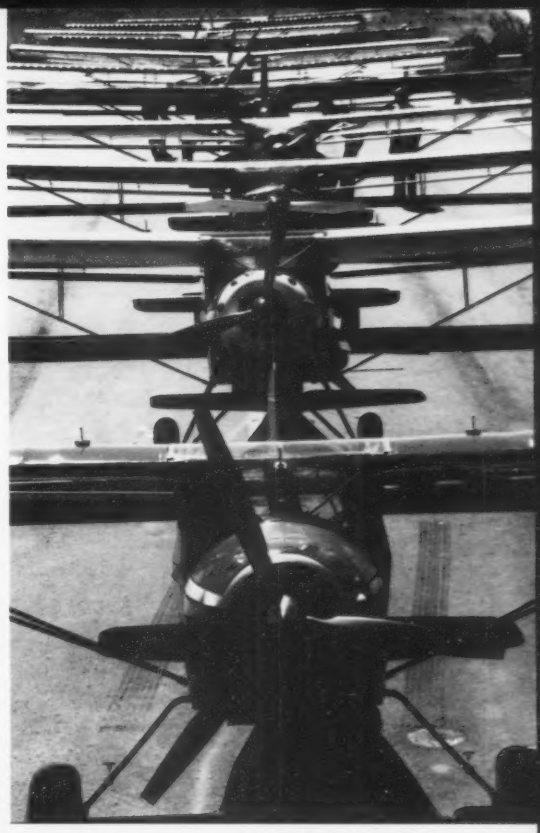
A recent NASA Aviation Safety Reporting System (ASRS) report highlighted a potential safety issue that all pilots and passengers need to be aware of for their own safety. The report described a fire onboard a commercial airliner during passenger boarding caused by a novelty butane cigarette lighter. The report said a foreign passenger, who did not speak English, was transporting five animal-shaped butane novelty lighters in his carry-on luggage. One of the animals was horse shaped. Apparently another bag struck the tail of the "horse" which was the activation mechanism device for the lighter. The lighter ignited and started a fire in the bag. The smoke was detected and approximately 220 passengers were evacuated from the aircraft. According to the report the aircraft's captain was thankful that the bag was not in the baggage compartment." After the smoldering bag was removed from the overhead bin, the singed bin was inspected, taped shut, marked "inop," and the flight was able to depart.

FAA Aviation News thinks everyone should be aware of this incident because it could possibly happen in a general aviation aircraft. When was the last time anyone thought of the danger of carrying any type of butane lighter in a general aviation aircraft, let alone ask their passengers if they are carrying anything that could cause a potential fire. To protect both you and your passengers, you may want to review the safety rules for carrying potentially hazardous items in an aircraft.

One good place to start is with the Department of Transportation's Research and Special Programs Administration(ASPA) which sets the Department's federal hazardous materials (hazmat) standards. The FAA uses those standards as its aviation safety standards. Maybe you should also. There is a special toll free telephone number (1-800-467-4922) for the Hazardous Materials Regulations Information Center. In Washington DC the number is 202-366-4488.

P-FACTOR

by Henry W. Davison



P-factor is a phenomenon involving the propeller that occurs whenever the engine thrust-line vector does not coincide with the airplane flight path. In one example, such is the case when the airplane is in a slow-flight profile. With this profile, the descending blade achieves its highest effective pitch angle while passing through the horizontal position. Conversely, the ascending blade is at minimum effective pitch when horizontal.

Simply put, P-factor amounts to unequal thrust of one propeller blade compared with the others at any given point throughout a revolution cycle. The end result translates into an effect on the propeller plane-of-rotation that is visualized as a solid disc. This unbalance in thrust, called asymmetric propeller disc loading, displaces the center-of-thrust from the axis of rotation. As a consequence, this phenomenon obviously causes adverse yaw when uncorrected by control input. Secondly, it causes inefficiency in propeller and airplane performance, especially at high angles-of-attack.

Mush Angle

P-factor has a direct relationship to the wing angle-of-attack beyond the angle-of-incidence, or the angle between the longitudinal axis and the flight path in acrobatic configurations. Flight maneuvers, such as the knife edge or inverted flight, display this mush angle when sustained flight depends on excessive speed, fuselage lifting body effect, and the oblique thrust vector. The greater the mush angle, the more dominant P-factor becomes, up to the threshold of blade stall.

Resultant Relative Wind

The difference in thrust in the various blade positions is the result of fluctuating angle-of-attack accountable to blade angle and resultant relative wind. The blade angle was previously described; relative wind is set to begin.

The resultant relative wind or inflow air is conceived from two relative wind components: one by virtue of propeller rotation, the other by airplane flight path. In reviewing the definition, relative wind is wind created by motion of an object and acts directly opposite to the direction of motion. A resultant relative wind is the average of the two relative wind components.

Because the blade leading edges are opposite from each other (when horizontal, one side faces down; the other side, up), the resultant relative wind exposes the descending blade to a headwind advantage. The opposite side blade, however, experiences a reduction in headwind because of the greater span between the two relative wind components which alters the average wind vector. While the flight path relative wind component is far less prominent than the rotational wind component, the differential effect in airspeed is significant enough to contribute to the thrust dilemma.

Additionally, the blade center-of-pressure constantly changes with blade angle-of-attack. Like the wing, center-of-pressure moves forward when angle of-attack increases, and aft when it decreases. Consequently, the variable drag component influences the other resultant forces.

P-Factor - Light Twin Airplanes

As the saying goes: "When you lose an engine on a light twin, you lose 50-percent of power and 80-percent of performance." Consequently, slow flight becomes automatic, and P-factor comes with the territory. On a twin where both engines turn clockwise, losing the left engine is more critical to flight than losing the right, as far as P-factor is concerned. The asymmetrical disc loading on the right engine propeller is further from the airplane CG than that for the left engine propeller. With a greater leverage on the right engine, the minimum single-engine-control-speed (Vmc) increases when the left engine is out.

With counter-rotating engines, the left engine turns clockwise; the right engine, counterclockwise. The leverage effect is then minimized.

Summary

When analyzing the P-factor phenomenon, one can conclude that propeller performance is far less than expected, especially when climbing out at a high angle-of-attack at low altitude. Part of the art of flying is knowing where the imaginary boundary of safe operation exists in that moment of truth.

Mr. Davison is Flight Instructor, ATP, and A&P.

Keeping IA's Current

Story and photos by H. Dean Chamberlain

Like the coming of the seasons and the requirement for annual aircraft inspections for most general aviation (GA) aircraft, there is another annual requirement in aviation that many people may not know about. During March of each year all of the nation's FAA certificated aviation maintenance technicians with inspection authorization (IA) must renew their IA authority. Why are IA's important? An IA is the only person who can sign off an annual aircraft inspection among other important tasks.

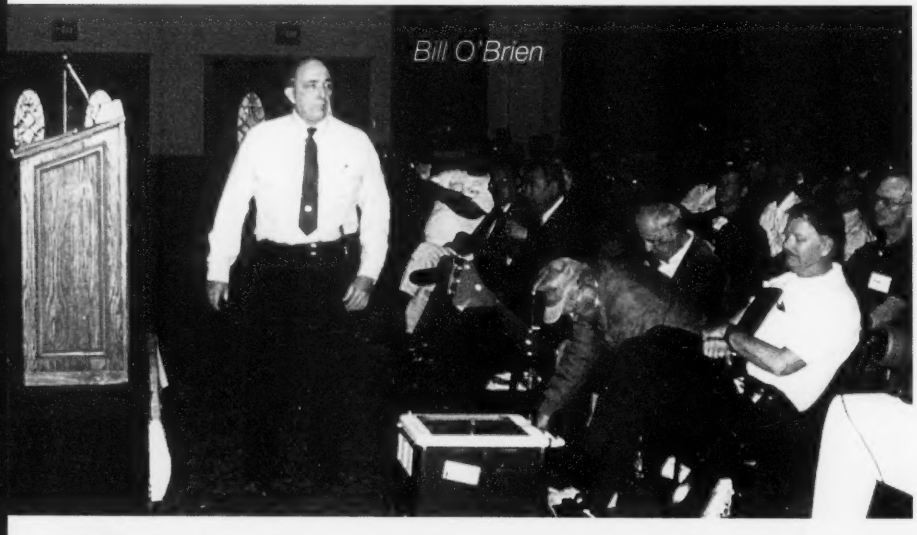
One way IA's can renew their inspection authority is by attending a minimum of eight hours of FAA-approved refresher training each year.

One such training course was held in the greater Los Angeles area during February. What made this two-day course unique was its size. About 1,000 people attended the first day of training. These included IA's, maintenance technicians, and pilots on February 26. Several hundred more attended the second day's training sessions. Held in Buena Park, a small community in Orange County, the meeting exceeded everyone's expectations.

Organized by the five Flight Standards District Offices (FSDO's) in southern California (Los Angeles, Long Beach, Riverside, San Diego, and Van Nuys) and the Aviall Corporation, the 1999 Aviation Maintenance Technicians and Pilots Symposium may have been one of the largest, if not the largest, such symposium held in the nation.

CHARLES TAYLOR AWARD PRESENTATIONS

One of the highlights of the meeting was the opening ceremony where the FAA's Western Pacific Regional Administrator Mr. William Withycombe presented FAA's Charles Taylor "Master Mechanic" Awards to eight life-long aviation maintenance professionals. For those who are not familiar with the name Charles Taylor, Taylor was the mechanic who built and maintained the engine in the Wright Bothers first powered aircraft. In recognition of the important role Taylor played in the success of the Wright Brothers' historic flight and the important role aviation maintenance technicians play in aviation safety, the Charles Taylor Award recognizes those who have worked as aviation maintenance professionals 50 or more years. Thirty of those years must have been as an FAA-certificated maintenance technician. The remaining 20 years may be accepted if it was in the military, aviation maintenance, or the manufacturing industry.



Bill O'Brien

"TERRORISM IS A FORM OF COMMUNICATION"

Following the presentations, the ever popular FAA National Resource Specialist for Sports Aviation Airworthiness Mr. William (Bill) O'Brien gave his "Communication Wars Between Pilots and Mechanics" presentation to a wildly enthusiastic crowd. O'Brien, who told the audience "terrorism is a form of communication" involved some of the attendees (both volunteers and non-volunteers) in a skit that highlighted the problems of pilots and mechanics have in effectively communicating between each other. The skit demonstrated his point that there can be a serious communications problem between pilots and maintenance technicians who fail to take the time to clearly communicate. (There have been many articles published on how poorly pilots write up aircraft problems (squawks) and how hard it is for mechanics to fix a problem when they don't fully understand what the pilot meant.) Effective communication has been and continues to be a problem

Industry door prizes being presented during a break at the seminar

between those who operate aircraft and those who repair those aircraft. Sort of like the old comment about what you thought you heard me say was not what I meant to say.

PROGRAM FORMAT

After the battle of words, the symposium broke out into three classroom segments for the remainder of the day where courses on such topics as maintenance-related aircraft accidents to classes on corrosion technology to how to complete an FAA Form 337 to classes on the more popular piston and turbine aircraft engines.

Throughout the day, FAA Aviation Safety Inspectors from the five FSDO's documented the hourly classroom attendance of those IA's who had to complete the required eight training hours for certificate renewal. This documentation was to ensure that the IA's did in fact comply with the regulatory requirement.

The following day, many of the same classes where held for those IA's, maintenance technicians, and pilots who could not attend on the first day.

Since an IA could meet the training requirements for renewing his or her inspection authority by attending eight hours of training on either day or parts of either day, the second day had less people attending. Some individuals were there both days so they could attend a class they had missed the first day because of scheduling conflicts etc., even though they might have completed their required eight hours of training.

Once an IA had completed his or her eight hours of training and had the training documented on the special training form designed to meet the respective needs of the five FSDO's involved, the IA then could take the form back to his or her local FSDO during March to renew his or her inspection authorization.

This annual March IA renewal process gives a new meaning to the national media's hype of college basketball's national championship series commonly known as "March Madness."

INDUSTRY SUPPORT

Throughout the two-day training symposium, more than 50 aviation companies had exhibits and displays set up in one of the conference center's rooms, and company representatives were available to explain or demonstrate their respective products and services. Some of the company representatives conducted some of the technical training classes given during the symposium.

Much of the industry support provided at the symposium was coordinated by Aviall's Senior Manager Marketing Services Dan O'Neill.

O'Neill said, "I have been doing this for about 15 years. We got involved in working with the FAA at the Reno FSDO's IA renewal meeting through our San Francisco office. When other FAA offices saw the support Aviall could provide, they too wanted to work with us. We did a program in Honolulu last month, then this one, and next month we will be back in Reno," he said.

"It is a win-win situation for all of us. It is a good program for FAA and for Aviall. We can bring a lot of suppliers to this size of meeting, and FAA can bring a lot of our customers to the meeting, so we all benefit," O'Neill said.

"We also do these programs without FAA involvement. Aviall has its own FAA-approved certificate to do IA renewal training," he said, "and a lot of what we do is driven by our customer service centers."

He said, "Our suppliers do a lot to make our programs successful."

"We have been doing a program in Atlantic City of more than 15 years. We conduct a program in Toronto, Canada, and we hold seminars in other cities around the world," he said.

When asked why Aviall supports

these types of training courses, he said, "We recognized a long time ago that programs like these allow the mechanics who work on the aircraft to meet face to face with the suppliers and experts from the companies they buy products from. In many cases, working mechanics may not have another chance to meet with these industry experts since in some companies, only senior managers or directors of maintenance or similar levels of managers may attend the larger industry meetings or conventions where many suppliers exhibit their respective companies' products or services," O'Neill said. This way, everyone gets a chance to benefit, he said.

LESSONS LEARNED: RULES AND PARTNERSHIPS

Since *FAA Aviation News* is distributed throughout the FAA, its safety program, and to readers through subscription, we thought other FAA offices and aviation companies interested in hosting an IA renewal symposium or other types of training could learn a few lessons from the Southern California FSDO's. Organized by the Airworthiness and Operations Safety Program Managers at the five FSDO's, several "rules or needs" were quickly developed or recognized. The first was the need to have total FSDO and Regional management support. Management support is critical to the success of any project, and when you have five offices participating in an event where one of those offices is separated by about 100 plus miles from the others, management support is critical both in terms of providing budgetary support and in terms of making working time available for people to attend meetings and to work on the project.

The second important rule is to start planning and working on the project as soon as possible. Time is irreplaceable. The goal should be to meet regularly and often.

The third is to have expert help and support in the planning process as early as possible.

In the case of this symposium, Aviall, which conducts its own training courses around the United States and the world, was able to use its experience to help coordinate many of the activities such as arranging for participating companies' displays and representatives and even paying for things that the FAA cannot provide as part of its support.

When working on a joint project involving government and industry, it is important that all participants involved review the rules about what a government agency can and cannot do while working with a non-governmental organization. By reviewing the rules, each organization knows exactly what support can be provided or accepted and what cannot. This review eliminates any confusion about what is appropriate support of a government sponsored event.

In addition to industry support, the support provided by the Buena Park Convention and Visitors Office was very important. In fact, many times, the Convention and Visitors Office would also represent local businesses that could not attend a particular planning meeting.

The result of this FAA-industry-community cooperation between government, industry, and the hosting community was a better symposium. A better symposium where everyone, the participants, the local community, the supporting sponsors, and the FAA all benefited.

ECONOMIES OF SCALE

Let's face reality, not every part of the country has the number of IA's in its area to justify a large renewal symposium like the greater Los Angeles metro area has in its geographical area. But if you do, there are economies of scale that make organizing a symposium of this size practical. One is more companies are willing to send their marketing and technical experts to a meeting where they can expect hundreds of IA's and maintenance technicians and pilots to attend. That industry availability and the chance to meet and talk to subject matter experts becomes another reason for more IA's and others to attend the meeting. The problem for many smaller areas is some companies may be less apt to support a meeting where only a handful of attendees are expected. Without the industry support, it may be hard to attract the number of IA's needed for industry to participate. You need one to get the other.

Then too, exhibitors, like at the LA IA renewal symposium, can also help share the cost of a larger more convenient meeting facility by paying fees to the industry co-sponsor. This in turn may generate more participant interest which attracts more industry participation, etc.

Although the FAA cannot and does not charge a fee of the participants in FAA—sponsored events, an industry co-sponsor can make its own arrangements with its supporting industry partners and exhibitors.

BENEFITS OF COMMUNITY SUPPORT

Another important planning element was pointed out by Pattie Davidson from the Buena Park Convention and Visitors Office.

"Buena Park is a small community with only about 2,000 hotel or motel rooms. Although we are near Disneyland and other attractions, a symposium of this size is appreciated by the businesses of Buena Park. It is better to be a big fish in a small pond than a small fish in a big pond," she said.

"It is also important to get local expert help, such as that provided by our Convention and Visitors Office, as early as possible. We know the merchants and businesses and can provide a group with support which it may not know is available."

She pointed out several important items planners for any meeting should consider such as having only one person to deal with for decisions for such things as catering services and space requirements. Other important considerations are knowing the benefits of off-peak convention and hotel rates and room and conference center availability, availability of parking, size and number of conference and training rooms, local transportation, airport

FAA Western Pacific Regional Administrator Mr. William C. Withycombe opens the IA meeting.

data, road access to the meeting and hotel sites, and near by family activities. Family activities are important for those participants who may bring their families with them as part of a mini-vacation, and who do not want to worry about having to entertain their families during the symposium.

PARTICIPANT ACCOUNTABILITY

In the case of any FAA-approved certificate renewal program, a means must be developed by the sponsor or provider to account for the required training hours. In the case of this symposium, the FSDO's developed a special IA renewal form recognized by all five offices.

There must also be enough on site FAA or sponsor support personnel to provide prompt and courteous service to those attending. In the case of the FAA inspectors monitoring the event, each was provided a special rubber stamp to document IA attendance after each training class. There were enough inspectors available each day to minimize the wait of the IA's needing to document their attendance after each specific training class or period.

And finally, according to several of the FAA participants, each event needs a single coordinator to control all activities and make last minute decisions at the event. In fact, a "mini-dictator" may be needed--someone who may believe in O'Brien's comment that communication is a form of terrorism. That person should be someone who can get the job done, and who can make sure that all of the small details are accomplished on time. As one FAA inspector said, "We had to have a forceful leader who could take charge and make it work."

Of course, that someone needs to be a person everyone can also work with. In the case of this symposium that person was Bruce A. Borden. He is an FAA Aviation Safety Inspector, Airworthiness, from the Van Nuys FSDO. He was able to coordinate all of the work involved in a way that respected everyone's opinions and comments though his great tact and diplomacy. Not only was he able to work with all of the FAA inspectors involved from the five different offices, but he also worked well with the respective FAA management, FAA Regional management, and those involved from both the aviation industry and the local community. Together, the coordinated team of FAA-industry-community players was able to successfully conduct one of the largest IA renewals in the country.

Some of the factors that made the FAA effort so effective was that not only did the five FSDO's involved work well together, but each office assumed specific duties and functions for the event. For example, Long Beach FSDO was the lead office, and it hosted the meetings, handled the registration and certificates, and did the publicity for the seminar. The Van Nuys office was responsible for the program and scheduling. The San Diego office arranged for the meeting place, food, and the logistics of staging the event. The Riverside FSDO was responsible for coordinating all of the audio-visual equipment needs during the two-day event. And the fifth office, the Los Angeles FSDO, was the FAA liaison with the various sponsors and vendors. Together, the five FSDO's and their respective staffs were able to hold one of the largest IA renewal seminars in the country.

The key to their success was simple. Pick your best people. Start planning early. Meet often. Work hard. And success will follow. It did in LA.

Editor's Note: FAA Aviation News wants to recognize the outstanding support provided by Kathleen O'Brien. She is an Aviation Safety Inspector and the Safety Program Manager, Operations, at the Long Beach FSDO. She was one of the FSDO's planners involved in the following article, and her support for Mr. Chamberlain while he was in California was appreciated.

• High Altitude Endorsement

In reviewing the requirements for a high altitude endorsement under FAR §61.31(g), I am confused about the flight training portion. Is the purpose of the requirements of §61.31(g)(2) to receive training in the flight characteristics of a pressurized aircraft or to receive training in the operation of the pressurization system of the aircraft? I ask this as Subparagraph (g)(2) permits the flight training to take place in a flight training device, which, under §61.1(b)(7), need not have motion simulation. In other words what is the real purpose of the training of the flight portion of the high altitude endorsement?

M. Brown
Bismarck, ND

The answer is both. As stated in the regulation, the applicant for an endorsement to operate a pressurized aircraft capable of operating at high altitude must have demonstrated proficiency in the operation of a pressurized aircraft to an authorized flight instructor. The flight training device you referred to must be representative of a pressurized aircraft, its systems, and be able to simulate the aircraft in ground and flight operations as required by FAR §61.1(b)(7). And as noted in that subsection, the flight training device must have been approved by the Administrator.

• Decision Height

The following information was sent to the FAA Aviation News *by the Safety Program Manager at the Casper (WY) Flight Standards District Office. He wrote to correct our definition of decision height in the September 1998 Flight Forum article titled "Too Many Cats-Cat I, Cat II, and Cat III(A)(B)(C)."*

Decision height is a difficult concept for some people to grasp. However, airline pilots know exactly what DH means, but I've run into FAA aviation safety inspectors who could not understand the concept. At DH, a decision is made to "continue" or make a "missed" approach: Not to land or miss. At a further point down the ILS, the decision is still open as to what to do. The continue decision is still on. In every case in my airline career, I landed. According to your definition, DH and MDA are the same. They are not.

Jim Herzfeld
FAA Aviation Safety Inspector

You're right Jim. We used the term too casually trying to make a point. According to the FAR Part 1 definition, "Decision Height, with respect to the operation of aircraft, means the height at which a decision must be made, during an ILS or PAR instrument approach, to either continue the approach or to execute a missed approach." We should not have said "land/no land decision," which implies that the decision to land is irreversible. As FAR §91.175, Takeoff and landing under IFR, states the decision continues until either the aircraft touches down or cannot comply with the conditions outlined in the FAR for continuing the approach.

• Hand Propping and the FAA

The October 1998 *FAA Aviation News* issue had an article on hand propping titled, "Proppin' Revisited." According to the article's introduction, it said, "*FAA Aviation News* has always been of the opinion that hand propping should be a last resort, but, if it becomes a necessity, the proper sequence of procedures must be followed to ensure safety." The article did not say it was against the regulations to handprop an aircraft. Now some FAA personal are saying we can't handprop. What gives?

No Name
Hometown Airport, USA

There is no FAA regulation against hand propping. FAA regulations do prohibit hand propping an aircraft in a careless or reckless manner. In fact, many old aircraft can only be started by hand propping. The article discussed the safety aspects of hand propping. The article pointed out that improperly done, hand propping can kill or maim. The article was a reminder of how to hand prop an aircraft safely. Like many things in aviation, proper training and experience in hand propping can reduce the risks of starting an engine by hand. And as the article pointed out, there is safety in numbers. Two is always better than one. It is safer to have a trained person at the aircraft controls while someone is hand propping the engine than to only have one person involved in the operation. The key is having a trained person at the controls who knows the important safety steps required to safely hand prop an aircraft. Over the years, accidents have occurred with an untrained person at the controls during hand propping.

• 100-hour Inspections

In regards to the Flight Forum question and answer on the requirement to do a 100-hour inspection if you own your own airplane and hire a CFI to give you instruction: Let's say a number of folks get together and acquire more than one airplane with the intent to operate non-profit and allow only bona fide members the right to fly these airplanes (we could call it a "flying club"). Since we charge ourselves on a per-hour basis (enough to cover variable costs and pro rata fixed costs) and also hire CFI's to give us instruction (those of us who need instruction), are we required to do 100-hour inspections?

Fred C. Smyth
via Internet

No, according to the National Resource Specialist for Sports Aviation-Airworthiness. He said 100-hour inspections are not required because you are "not holding out to the public" the use of the aircraft.

CELL PHONES: A WONDERFUL DEVICE OR A PROBLEM? YOUR CALL.

Well, like in the movie "JAWS," just when you thought it was safe to go back into the water something comes along to cause you grief. In the past, this magazine has reported how cellular telephones have saved lives, and how one was even used to contact air traffic control when a commercial aircraft's radios failed. Now, we have heard of a problem caused by cellular telephones. Fortunately, it is a problem that can be avoided or at least minimized. An Air Traffic Manager at one of the FAA's Automated Flight Service Station (AFSS) has a problem with cellular phones. The problem is pilots are calling the AFSS for weather briefs and for filing flight plans using cellular telephones. As the manager stated in the letter to the magazine, "In most cases the reception is bad and the background noise level results in miscommunication and numerous repeats of information. In the interest of safety for our flying customers, we would like to submit the following...."

"You forget to call for a weather briefing at the office or home, so the cell phone comes in handy as you drive to the airport. You get a briefer on the line, but someone's blowing his or her horn as the weather advisories are mentioned. So, you get part of them. Just as the briefer begins to give NOTAM's for your destination airport, you stop at a red light and construction workers are busting up a sidewalk with a jackhammer. But, you were just there yesterday, so nothing should have changed. As you begin giving your flight plan, your reception starts to fade because you called long distance to reach your favorite briefer. The briefer understood you to say an altitude of 50, but you said 90.

"Pilots without cellular phones are almost as rare nowadays as airplanes without radios. Just as radio receptions vary from one place to another, cell phone reception and signal quality also vary. Taking the time to verify that your cell phone reception is clear and free from interference, while calling for pilot briefing services, ensures that the specialist understands your request. And you receive the information needed to have a safe and 'uneventful' flight. Safety is the main rule in the game even before you start your engine."

Are you one of the pilots just described? If so, you may want to consider your background noise environment and the signal strength of your cellular telephone when calling for a flight service briefing or to file your flight plan. After all, to paraphrase an old safety slogan, the flight plan you save may be your own. Better yet, whenever possible, you should use a standard telephone to call your friendly AFSS. That way both you and the briefer can hear each other clearly, and you avoid having to drive and talk at the same time—a practice some police jurisdictions frown upon. Plus it is hard to write down weather and NOTAM data while you are driving and talking. (Our cell phone safety message for pilots driving to the airport.) Using a regular telephone can be a classic case of everyone winning. Effective communications are important. After all, you might just want to know if there are sharks about.

YOUTH GROUND SCHOOL TO BE HELD AT EAA AIRVENTURE

Boys and girls of all ages are invited to learn about flying at a special ground school, *Explore Aviation*, at the EAA AirVenture in Oshkosh, WI. *Explore Aviation* is a fun program sponsored by Women in Aviation, International (WAI) that explains the principles of flight, different kinds of aircraft, what it takes to earn a pilot's license, and includes many experiments to illustrate the topics. The program was such a success at Sun 'n Fun that EAA invited WAI to offer the program again at Oshkosh.

The program will be held Thursday, July 28, through Sunday, August 3, at 11 a.m. at KidVenture behind the Eagles Hangar at the EAA Museum. For more information on the Explore Aviation program, contact Women in Aviation, International at 5375 Cyprus Circle, Nashport, OH 43830; phone (740) 452-6462; FAX (740) 453-3758; Email wai@infinet.com; web <www.wiai.org>

NEW AIRMAN TRAINING AND TESTING NUMBERING SYSTEM

The FAA is changing its numbering system for airman training and testing materials. Designed to make it easier for people to find information in the future, the new numbering system will be implemented as the training and testing advisory circulars (AC's) are revised.

The following major groups will be used to number appropriate AC's. A specific series number will be issued for the revised materials and published in Appendix 5 of AC 00-2, Advisory Circular Checklist.

The following two series are currently listed:

FAA Computerized Testing Supplements, FAA-CT-8080

FAA Practical Test Standards, FAA-S-8081

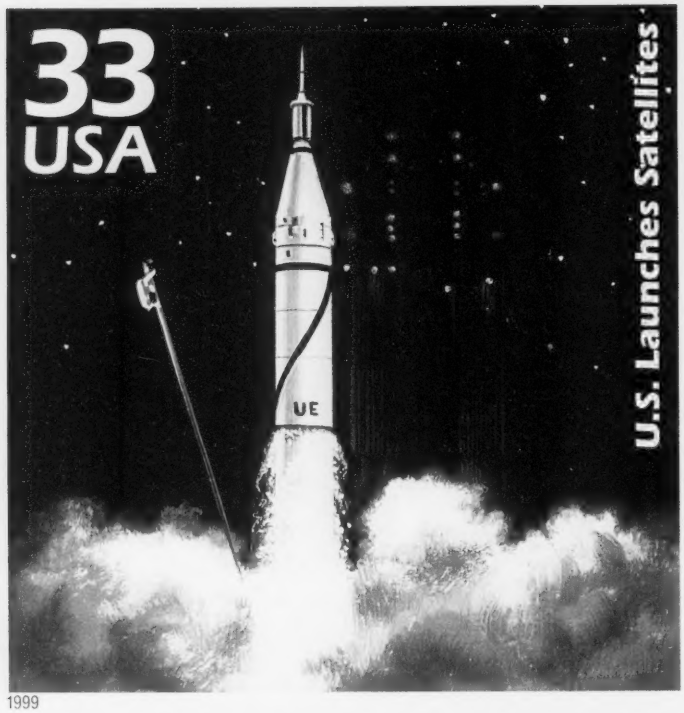
The following two series are proposed:

FAA Knowledge Test Guides, FAA-G-8082

FAA Aeronautical Handbooks, FAA-H-8083

For current airman training and testing material information, readers can review the FAA's Regulatory Support Division, AFS-600's internet web page at <Http://www.mmac.jccbi.gov/AFS/afs600>.

AVNEWS



ROCKET STAMP

The U.S. Postal Service has released more of its new "Celebrating The Century" stamp collection. Designed to highlight significant events, people, places, and trends of each decade during the past 100 years, the "U.S. Launches satellites" stamp is one of the 15 stamps commemorating the decade of the 1950's. It is now available at your local post office.

CALENDAR OF EVENTS

September 10-11-12 The second annual EAA Golden West fly-in at the former Castle Air Force Base, now Castle Airport, near Atwater, CA, is scheduled for September 10-11-12. For more information, you can visit the following internet web site. Http://www.gwfly-in.org.

The FAA's Aviation Safety Program will have a display area at the fly-in to promote aviation safety. Stop by and say hello to your local FAA Safety Program Managers.

September 18-19 Potomac '99 at Potomac Airpark in Berkeley Springs, WV. EAA Chapter 36 will hold its 22nd annual fly-in/drive-in with "awards, food, fellowship, and just plane fun." Young Eagles flights (ages 7-18, free with parent's permission) will be offered free. Antique and classic cars on display. For more information call D. Truax at (717) 294-3221.

November 17 15th Annual Great Lakes Airport Conference at the Holiday Inn O'Hare International in Rosemont, IL. More than 40 speakers in four break-out sessions will discuss such topics as airport planning, design, construction, funding, operations, safety, FAR Part 139, capacity, environment, and land acquisition/relocation issues. For registration and general conference information, please contact Michelle at 847-294-7013 or by email at <michelle.lykken@faa.gov>.

Editor's Runway

from the pen of Phyllis-Anne Duncan

D****D if You Do or Don't

Most of the first word of the title is "starred" out, but I think you can get the drift. This is a family magazine after all. I'm writing this piece in early June just a couple of weeks after the annual U.S. Navy Blue Angels air show for the U.S. Naval Academy 1999 graduation and a few days after a spectator was killed at an air show in Slovakia after the crash of a military demonstration jet. Those of you outside the Washington Beltway may not have been aware of a potential situation concerning the traditional, annual Blue Angels show at the Naval Academy. In fact, the awful FAA almost had to cancel the show because of what some people termed arbitrary and unconstitutional requirements.

When you attend any of the hundreds of air shows annually in the U.S., you may not be aware of the strict standards the FAA has established to protect spectators. We designate in a regulatory waiver an "aerobatic box" beneath which no spectator or person not associated with the air show can be during the performance. This box's size is established based on the type and speed of the aircraft performing and is necessarily larger for high-performance aircraft, such as military jets. Also taken into consideration is the location of congested areas near the air show site. Some sites in the U.S. which previously hosted air shows are no longer viable sites because of the encroachment of residential or industrial areas.

In Annapolis, MD, home of the Naval Academy, the centerline of the aerobatic box for the Blue Angels show is the Severn River, and laterally the box extends for 1,500 feet on either side of that line. (On only one side, that distance can be reduced to 1,200 feet.) The problem in Annapolis was that, even when the smaller distance was used on one side of the line, the box extended over three private residences on the eastern shore of the river. FAA guidance requires that even private residences cleared of persons during an aerobatic performance for their own protection. For a number of years the show was conducted without problem, then, after a more thorough review of the area before the issuance of the waiver, FAA inspectors discovered that the box actually overlaid these three residences. The FAA gave the Naval Academy, sponsor of the show and holder of the waiver, three years to devise a new plan for the show so that the box would not overlay these three homes. The possibilities were to get the owners to leave their homes for the duration of the show, to shift the location of the aerobatic box, to get the Blue Angles to alter their performance radically, or to cancel the performance.

Canceling the performance was the easy but disappointing way out. Having the Blue Angels substantively alter a routine they had been practicing for months was not in the interest of their safety. (The FAA assures spectator safety in two ways: by the "sterile" area under the aerobatic box and by the standards that ensure that air show pilots operate safely as well.) Shifting the location of the box would mean keeping the local community from a good view of the show, so, asking the home owners to vacate for their own safety seemed the win-win alternative.

Two of the three home-owners complied for the show last year and this. The third, who steadfastly refused, shall remain nameless. So, in 1999, the Naval Academy opted to "shift" the aerobatic box so that it overlaid Naval Academy grounds and an otherwise empty field rather than this individual's property. A prime spectator area for the citizens of Annapolis and those non-citizens who like to watch this show could no longer be used as a viewing area. This viewing area could accommodate up to 50,000 people, and it was generally full every year. In his defense, the private citizen pointed out that he had a right to be in his own home whenever he wanted and to have guests there to observe the show. Every year he had held a traditional, annual party for some 250 guests. The government *can't* kick you out of your home, and it was not the FAA who made anyone leave, but this private citizen, who happened to be a lawyer, fought a bit of a PR war on the issue, evoking the Constitution, English Common Law, and whatever else made him look like a victim. The FAA was on the losing side of the battle. That was the d****d if you do part of this story.

Now, for the d****d if you don't.

What if we'd said, okay, Powerful Washington Lawyer, stay in your home with your 250 guests out on your lawn and try to dodge the flaming debris that is inevitable if the unthinkable occurs?

The fact is, because the U.S. does not allow spectators beneath the aerobatic box, there has not been a single spectator fatality at an airshow in the U.S. since 1951-that's right, 48 years). No other spectator event involving high-speed, fueled vehicles can say the same. NASCAR certainly can't.

This was brought home the weekend of June 5 when a spectator in Slovakia was thrown from the roof of a building, from which she was watching a military air show, by the explosion resulting from the crash of a high-performance jet. And we all remember the fiery crash at Ramstein, Germany that almost made the military ban air shows from U.S. bases. We can't say for sure yet about the Slovakia fatality, but had U.S., civilian standards been in effect at Ramstein, it is possible there could have been no spectator fatalities, because they would have been far enough away from the debris fall.

As safe as the Blue Angels and U.S.A.F. Thunderbirds (and our Canadian neighbors, the Snowbirds) are, can you imagine the response if the FAA had set aside these time-honored standards, and an accident did occur at the U.S. Naval Academy graduation, damaging property or injuring or killing persons on the grounds of a private home?

The FAA places the responsibility for the "sterilization" of the area beneath an aerobatic box on the sponsor of the aviation event. Sponsors have come up with some unique solutions for similar incidences in other parts of the country—free passes to the show, VIP seating, gift certificates, etc. Again, this is the sponsor's responsibility. Ours is only safety, and that's what these standards for the pilots and the aerobatic box are designed to ensure. As a spectator, you go to an air show to see talented pilots operate state of the art equipment in exciting aerial maneuvers—not to die—and it's the FAA's responsibility and duty to assure that doesn't happen.

We've been called the "Tombstone Agency" for supposedly reacting only after people die. For 48 years we've managed to keep the names of air show spectators off tombstones while allowing aviation to show off its best.

This is a case where we don't mind being d****d because we do.

'Til next time...

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